

CIO

P E R S P E C T I V E S

April 16-19, 2000

Ritz-Carlton

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The Face of the Now Economy

- Entertaining Change
 - Leadership and Success
- Nimble and Quick Organizations
 - Golf and Grass Are Green

The Face of the Now Economy



Forget the “new economy.” Electronic commerce isn’t the wave of the future, it’s right now. And traditional business rules are evolving to accommodate it. Transported and transformed by the Internet and global commerce, we’ve entered the “Now Economy”—an ever-changing era in which the customer is king, the world marketplace is the kingdom, and wired businesses everywhere are subject to 24/7 demand for constant information, customized products and instant electronic transactions.

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By exploring power, influence, interdependence and change, keynote presenter, **John P. Kotter**, acclaimed business author and professor at the Harvard Business School, spells out how CIOs can become more effective leaders. Attendees will receive a copy of his latest work, *John P. Kotter on What Leaders Really Do*, a collection of his most notable articles for the *Harvard Business Review* on the actual work of leaders. **Rob Rodin**, former CEO of Marshall Industries, Inc., discusses how he engineered Marshall’s transformation into a \$2 billion high-speed, high-profit, high-tech power house. Attendees will receive a copy of *Free, Perfect, and Now: Connecting to the Three Insatiable Customer Demands: A CEO’s True Story*, in which Rodin tells the dramatic story of that transformation from the inside. In his uniquely humorous way, **Stanley Bing**, author of *What Would Machiavelli Do?* and *Lloyd: What Happened*, offers a variety of tactics on how, as he states, “to seize the future by the throat and make it cough up money, power and superior office space.” **James C. Wetherbe, PhD** joins us once again as the conference moderator and experience leader, and presents

some of the pitfalls that CIOs need to be cautious about as they achieve change during turbulent times.

Justin Yaros, Twentieth Century Fox’s Senior Vice President and CIO, shares how the entertainment giant is working to understand both the current threat and future opportunities the Internet and other technologies represent to this industry. As the Executive Vice President and CIO of ClubCorp, Inc., the world leader in delivering premier country club and world-class private resort experiences, **Michael Dillard** offers insight into the pitfalls and benefits of incorporating high-tech in a very high-touch environment. **Tom Woteki**, CIO of the American Red Cross, discusses how the 120-year-old non-profit organization is refashioning its service delivery model to meet market demands; and formulating new business models to compete with other “.orgs” for volunteers, donors and customers. **Ann Delligatta**, COO of autobytel.com inc., discusses potential organizational challenges and opportunities on the digital marketplace horizon, and offers strategies for CIOs and business executives at various stages in this evolving process.

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The Eighth
Annual

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By looking beyond the bottom line, these five stars created true—and lasting—value.

SCHWAB

reinvented the
brokerage industry
by bringing
customers online

PAGE 70

U.S. ARMY

used simple
technology to
educate doctors
and save lives

PAGE 80

DELL

climbed to
number one with
its production line
makeover

PAGE 88

PFIZER

cut time-to-market
and boosted
its collaborative
spirit

PAGE 94

HOUSEHOLD

put homeowners
on the
fast track to
loan approval

PAGE 100

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NIGHTS,
AND
WEEKENDS.

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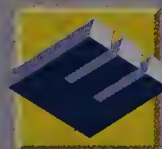
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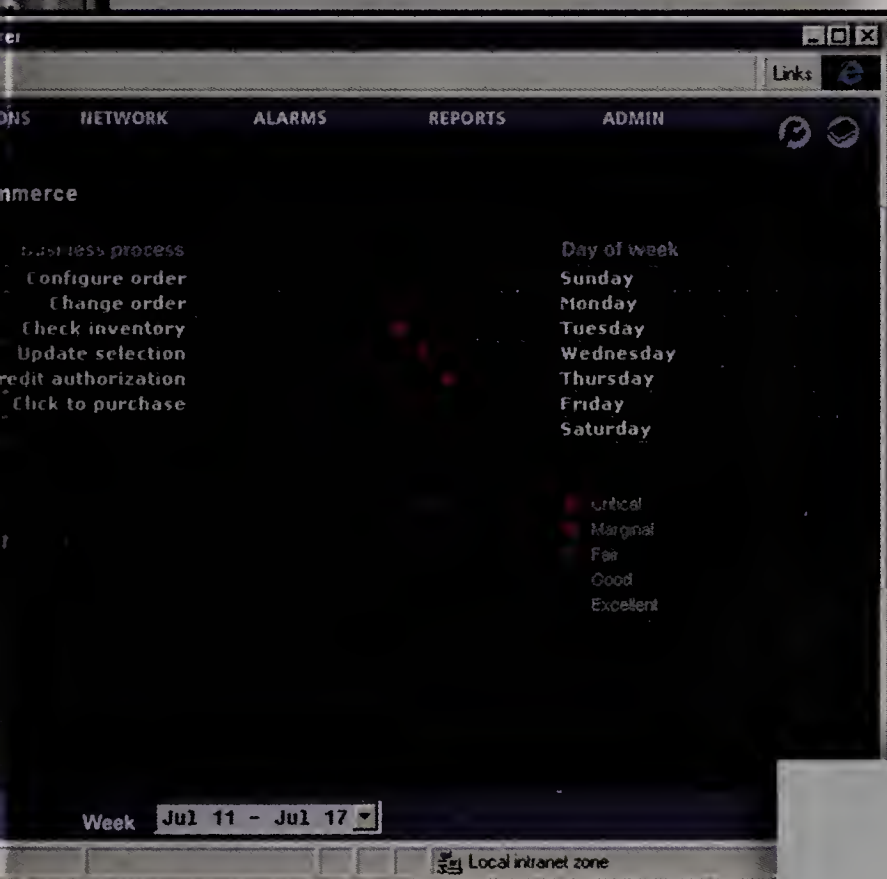


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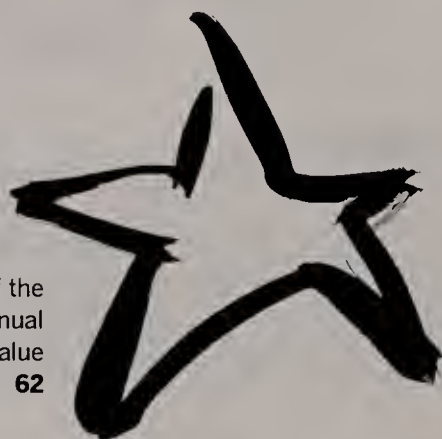
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CORIO

APPLICATIONS ON DEMAND

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Robert J. Davis, President & CEO, Lycos, Inc.

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New This Month

Unix or Windows? In the battle between operating systems there's still no clear winner. But surely, one is better than the other. Read "Deciding Factors" on Page 124 and join the debate. comment.cio.com

"It was always difficult to predict how fast the web was going to take off or whether or not it would crash. And there were certain points where this exponential rise could've just stalled out...so we kept our fingers crossed."

-Tim Berners-Lee, on inventing the World Wide Web. For more, visit CIO Radio at www.cio.com/radio.

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From the Editor

lundberg@cio.com

Lasting Value

It's part of the human condition to want to leave a mark. Life is fleeting; if we can create something that survives us, perhaps our lives will have greater meaning. When we started discussing this year's Enterprise Value Awards, we talked a lot about lasting value. The editors who had been involved with the awards in the past said that it's all very well to honor one-off business achievements, but are these isolated accomplishments or do they have some broader impact? We decided to find out.

We weren't alone in our interest. When the judging took place in early October, I was pleased to see the judges base their decisions in part on the broader impact of the entries. For example, Pfizer developed its electronic submissions system to get a particular product approved faster, but it applies to many new product launches. The U.S. Army's telemedicine project serves not only the medical personnel who use it but patients and their families all over the Pacific. Both Dell and Schwab changed the way customers buy their products, and their competitors are scrambling to catch up.

It has been our intent to offer you, the readers of *CIO*, a sense of such lasting value in this issue. If we have succeeded, it's thanks mainly to the efforts of two people: Elaine Cummings, who coordinated the development of the issue, wrote the overview, traveled to Hawaii (despite a serious fear of flying) to report the Tripler story (see Page 80) and edited most of the stories; and Tom Field, a four-year veteran of the Enterprise Value Award process who raised the



lasting-value question in the first place and reported on Schwab (Page 70) in addition to editing.

Thanks also to writers Mindy Blodgett, Stewart Deck and Derek Slater, who participated throughout the process, and editor Cheryl Asselin, who stepped in at the 11th hour to pitch in on the editing. Art Director Lisa Munroe has been involved since our earliest planning meetings, when we decided to photograph the judges in action. Marcy Dill and Susan Watson coordinated the video of the winners and judges, respectively, that will be used at the Feb. 1 awards ceremony in Tucson, Ariz. Once again, Lisa Kerber handled every detail of the awards process throughout the year and served as the point of contact for the applicants, process team, judges, editors and winners.

These awards would not be possible without the significant contributions of some extremely talented people outside *CIO*. Rick Swanborg, my cochair on the awards, and the members of the process team (for their names and affiliations, see Page 108) donated untold hours of their valuable time to evaluating and vetting the applicants and making sure the judges had enough good information on which to base their decisions. The judges, whom you'll also find listed on Page 108, were equally generous with their time and extraordinary insight. To all of you, my deepest and most humble thanks.

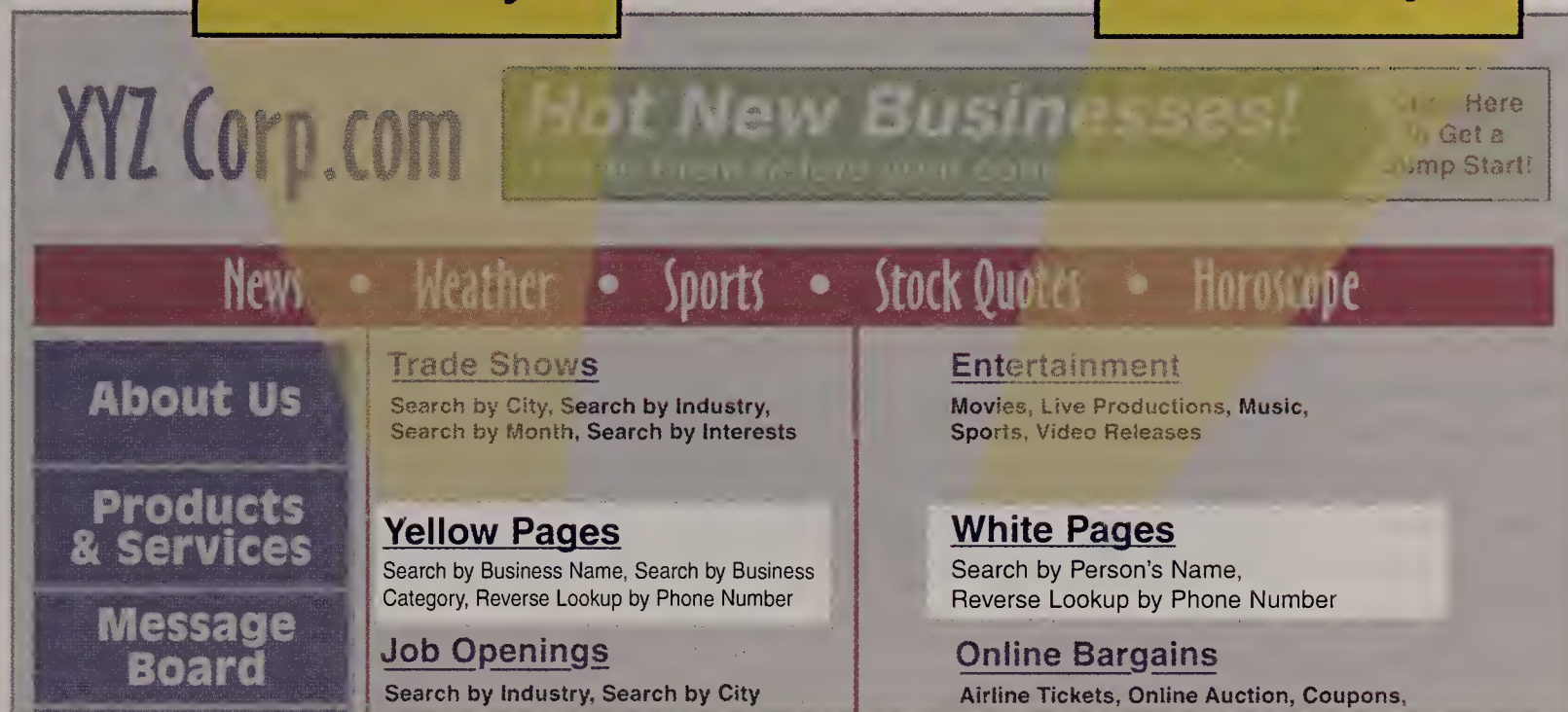
Allie Lundberg

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Reader Feedback

TOO MANY CHIEFS

A chief web officer title/job is idiotic [Home Page, *CIO Web Business*, Nov. 1, 1999]. It's akin to a CMO, a chief mail officer, or a CPO, a chief phone officer.

With all due respect to Jack Haber at Colgate-Palmolive, his being bestowed the CWO crown looks like a demotion to me. Does this mean he loses control over traditional marketing methods he'll need in order to drive people to the web to...what, buy toothpaste or dish detergent?

You hit the nail on the head painting the scenario of CIOs as derelict in their duties. It sounds like the classic situation of technology folks not being in touch with the rest of the enterprise—proactively adding value through intelligent and innovative technology applications.

I submit that wherever you see a CWO or another insipidly similar moniker, you'll find an entrenched and nonresponsive technology group.

Christopher Casey • President • Casey Advisory Services and Technologies Inc. •
Concord, Mass. • casey@world.std.com

VARIED BACKGROUNDS, CREATIVE SOLUTIONS

As a non-CIO, I have often been exposed to the consequences of poor leadership within the information technology field. It is encouraging that at least in the United States there is a concerted effort from some companies to bridge the gap between technical ability and leadership ability [“Teaching Johnny to Lead,” *CIO*, Nov. 15, 1999].

I was also struck by the high percentage of women mentioned or quoted in the article. Is it possible that as women move into more pivotal roles within the IT industry that the slightly different focus they bring enables the creation of such programs?

In my experience, the more varied an IT team's background, the more creative the solutions they are able to come up with.

Bruce Hobbs
Network/Systems Administrator
FoodStuffs-Wellington
Wellington, New Zealand
madkiwi@es.co.nz

OFF THE HOOK

Recent comments regarding Hook-SuperRx attributed to Herb Johnson in “Maalox Moments” [*CIO*, Nov. 15, 1999] certainly need some clarification.

Mr. Johnson asserts that bikini-clad women and strippers were part of the Hook culture. Nothing could be further from the truth! Hook-SuperRx ceased operations July 15, 1994, when it was sold to Revco Drugstores. I can assure you, as a former officer of that fine company, that the actions noted by Mr. Johnson were never condoned within our organization. If any such incident had occurred, we would have reacted just as strongly and rapidly as did CVS.

Hook Drugstores has a long and prideful history of nearly 95 years, dating back to 1900. Throughout that

WHAT DO YOU THINK?

Send letters to letters@cio.com.
Letters may be edited for length or clarity.

period there were numerous examples of corporate and associate contributions to the Midwestern communities it served. Mr. Johnson's comments besmirch the high standard of ethics the company professed and maintained during its history as well as the many contributions of its associates.

I strongly recommend that your publication cease attempting to be another supermarket tabloid. Stick to your knitting as a reporter of solid information technology; all of your readers will be better served!

Rick Powis

*Proud to be known as a former
Senior Vice President
Hook-SuperRx Inc.
rpowi1@eckerd.com*

*Senior Editor Christopher Koch
replies:* Mr. Powis ignores the reason that Herb Johnson's comments were included in the story. Allowing strippers to perform at an employee event was the impetus for including those comments.

The managers who sanctioned the event had been at Hook-SuperRx prior to the merger. Given the extraordinary impact the event had on the distribution center (senior managers fired, others asked to leave and some female employees disturbed enough by it to phone CVS headquarters to complain about it), we believed it was relevant to the story.

These are the tough types of issues that companies can face when they buy other companies. Merging companies is not just about stock prices, computers and SKUs, it is also about people.



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ENDING THE CONFUSION

I read your editor's note about the change from two (three? four?) different sections of *CIO* to a single section ["*CIO—The Next Generation*," *CIO Enterprise*, Nov. 15, 1999].

Good move. I found the multiple copies confusing, found myself reading/skimming them equally and thought they were more trouble than

to the people it serves directly in response to a stimulus. Although the government as an entity is making progress, it is making that progress at glacial speed with regard to common issues such as privacy, how to locate information, where and when to use a digital signature, the Electronic Freedom of Information Act access and how to develop service delivery

Government behavior is like that of a multi-celled animal. It responds to food (funding) and to certain stimuli (the Congress), but it does not respond to the people it serves directly in response to a stimulus.

they were worth. I always like the *CIO* content, but that packaging wasn't great.

Most of all, thanks for your candor in your editor's note. Contrary to what most editors would have done, you didn't write something about "changing industry dynamics caused us to further refine our editorial directions," etc. Rather, you said, "Hey, we tried it. It seemed like a good idea at the time, but we messed up." A refreshing change.

Gil Gordon
President

Gil Gordon Associates
Monmouth Junction, N.J.
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GOVERNMENT GRIPES

I enjoyed reading "The Making of E-Government" [*CIO Enterprise*, Nov. 15, 1999] and thought I would share my two cents after having just left the Senior Executive Service corps.

Government behavior is like that of a multi-celled animal. It responds to food (funding) and to certain stimuli (the Congress), but it does not respond

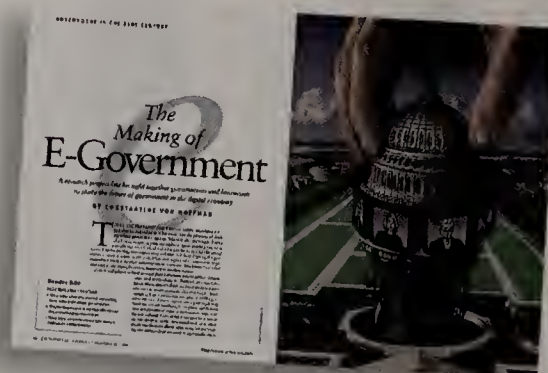
via the least costly route, the internet. The government fundamentally cannot agree on implementation on any issue.

Lest we forget, investment dollars to build out, convert information and then deliver it on request or process requests electronically are capital-intensive and, when serving millions of people and tens of millions of transactions, the problem is quite large if the infrastructure is not capable of scaling or expanding to encompass new services. The current projections with regard to surplus that might be repurposed into programs such as Medicare and Social Security would be wiped out if all the systems that were requested to receive funding had received approval.

After my six years with the federal government, I doubt the web is capable of solving the problems that government has and the way it responds to attempt to solve them. Just look to the IRS for examples of misguided and inappropriate project spending. For example, while at my former agency I constructed a joint

venture with the private sector to build a single governmentwide information portal with a search tool that was self-funding and charging only for some content services covered under the Paperwork Reduction Act that allows for cost recovery. Its ultimate cost to the government: zero. Its requirements upon webmasters or anyone else in government for maintenance: zero. The result was a series of misguided attempts by unknowledgeable officials to shut it down. Today it remains the only product able to easily locate government information.

As a result, the things that government does not do well, if at all, continue to be left undone through such narrow-mindedness of the officials who claim to aspire to make government work better and less expensively. There is clearly a message that strong disincentives are attached with actually trying to help government overcome its problems of selecting and implementing technologies related to the internet.



I submit that government will continue to muddle along, driven by what Congress feels is important and not the creative or well-thought-out solutions that are actually needed. Most administrations are quite powerless to change this simple fact.

Sandy Waters
Northern Light Technology Inc.
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Cambridge, Mass.
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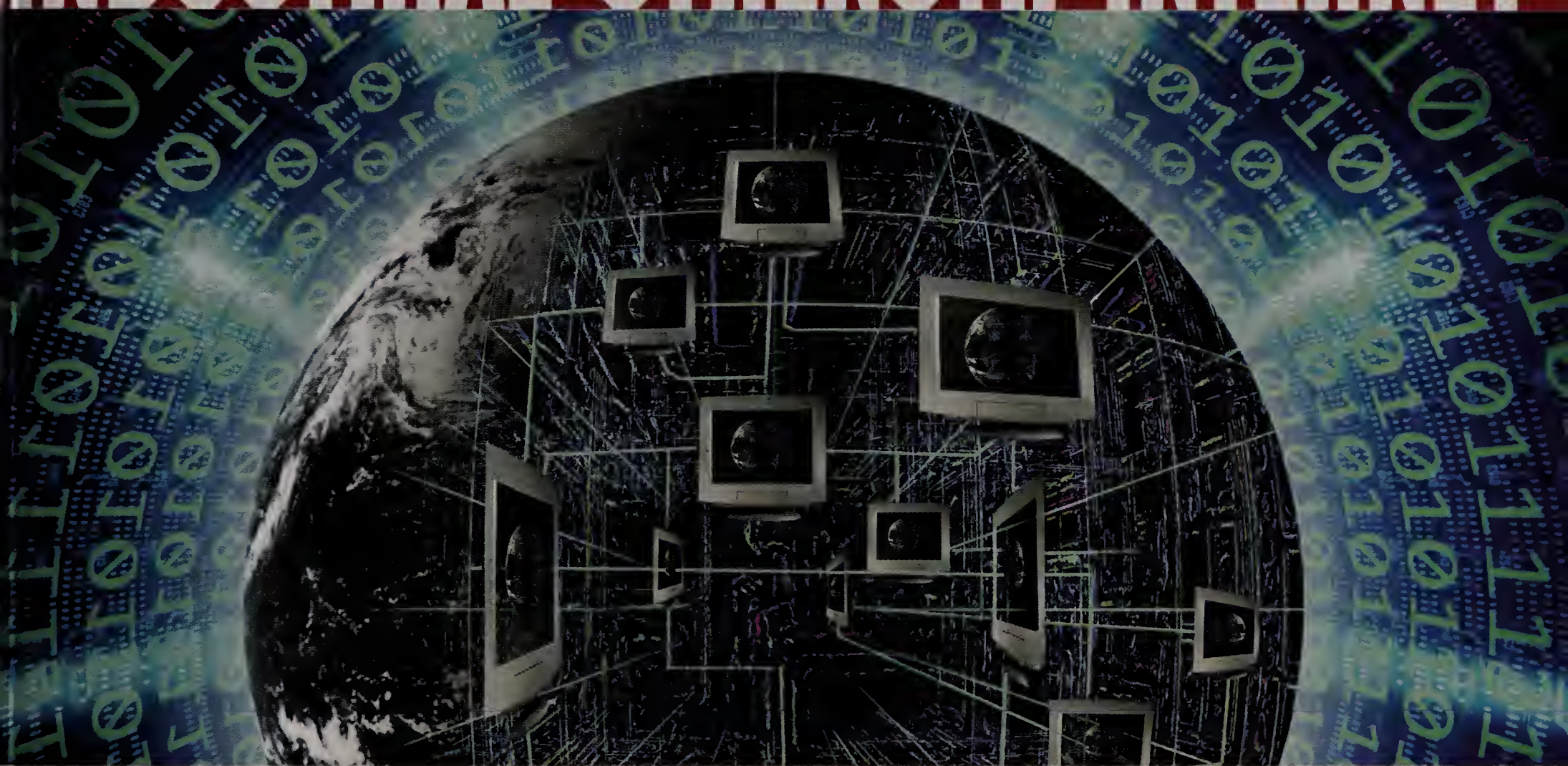
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Edited by Katherine Noyes

Beating the Odds



Now that the millennium date change has happened, you may think there's no more fun to be had with dates for a

long time to come.

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Another important date fact: Last Nov. 19, or 11/19/1999, was the last all-odd numerical date we'll see until Jan. 1, 3111.

Who'd have thought!

C L I C K - N - S N I F F

The Scent of a Website

SO LONG, SCRATCH-N-SNIFF. Today we have the online equivalent. DigiScents, an interactive media startup in Oakland, Calif., has developed iSmell, technology to bring the sense of smell to the web.

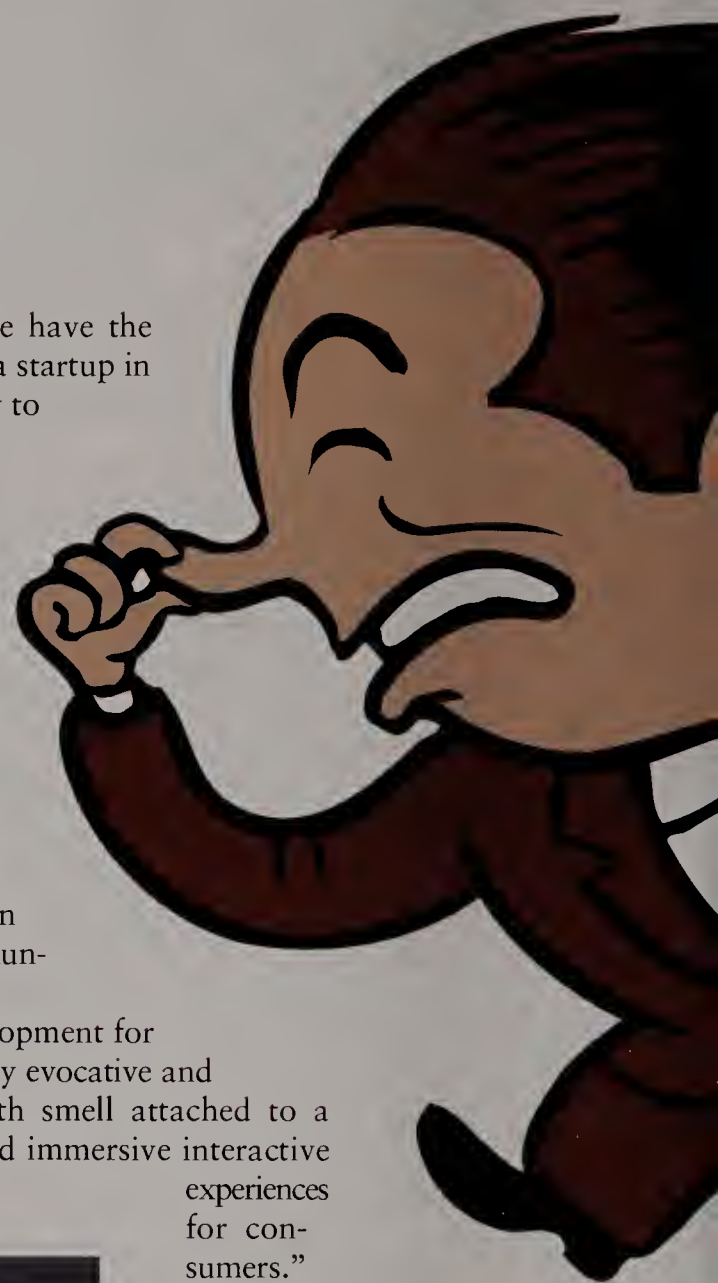
iSmell, due to be released this fall, consists of both software and hardware. The iSmell hardware, which plugs into the USB port of a PC or Mac, releases essential oils from cartridges much like ink in a printer. Once the oils are emitted, they vaporize through the air, intoxicating the user with scents that match a specific online product, music, console game or food. The software, which can be downloaded off the DigiScents "snortal" (www.digiscents.com), triggers the hardware to release the right smells at the right time. Fragrances will be sold in scent-palette cartridges that contain more than a hundred recognizable scents.

John Williams, vice president of business development for DigiScents, explains: "Smell is the most emotionally evocative and memory-inducing sense that humans have. With smell attached to a product on the web, we could create realistic and immersive interactive

experiences for consumers."

iSmell will cost less than \$200 for hardware and software.

With all the odorific possibilities, it's no surprise that Kraft Foods is negotiating with DigiScents to incorporate smell into its web applications, kiosks and focus groups.



T E C H N O L O G Y

"The machines may be smarter, but we're still as crazy as bedbugs."

—Paul Saffo, director, the Institute for the Future, during an executive education course called Reinventing Commerce at Net Speed.

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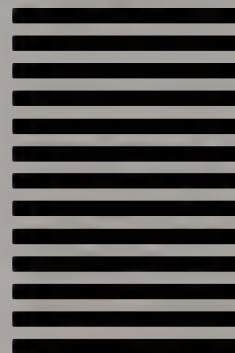
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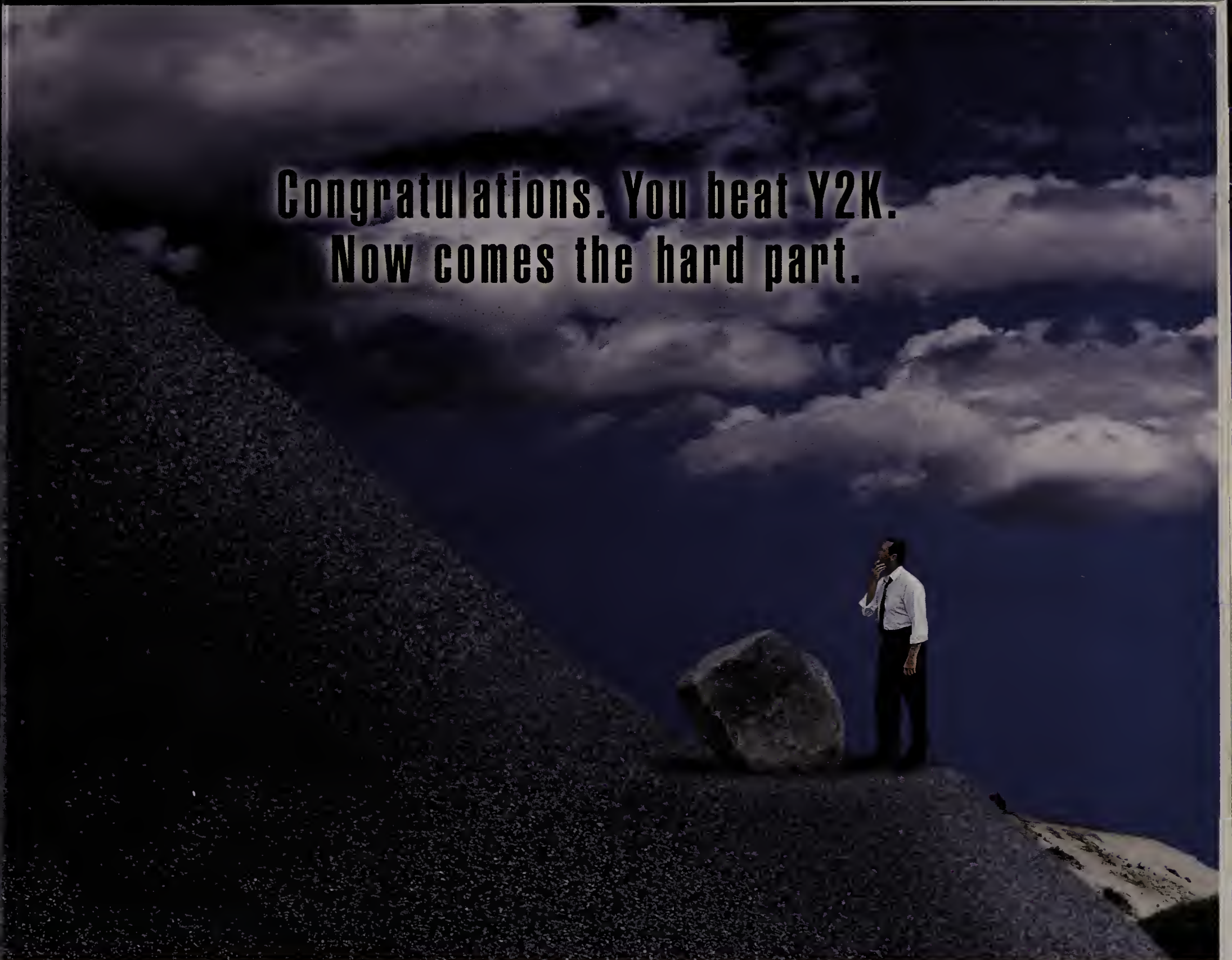
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Exercising Options

TOUCH YOUR TOES! Flex those arms! Now click your mouse! If you do it right, you'll be on your way to virtual fitness and an A on your report card.

Online educational programs have been gaining popularity for years, and now even phys ed classes are jumping on the technological bandwagon. At Malone College in Canton, Ohio, instructor Charles Grimes teaches "PE 250: Fitness for Life" via the web, and he doesn't find it all that strange.

Grimes has had to alter his teaching methods a bit for this course; after all, he can't blow the whistle at students who loaf. To do well in the class, students must keep logs of their exercise and nutritional habits,

take fitness tests and participate in online chats about the coursework. "I must admit this is a risk. I don't have nearly the control over what each student is doing," he says. "I rely heavily on encouragement, lots of interaction and trust. I'm much more like an online personal trainer than a college PE instructor."

Florida High School, an accredited institution whose classes exist solely online, also offers a personal fitness course for credit. The 38 students in the class, who live across the

state of Florida, plan personal training programs, submit workout logs and communicate with instructor Jennifer Jackson at least twice a week.

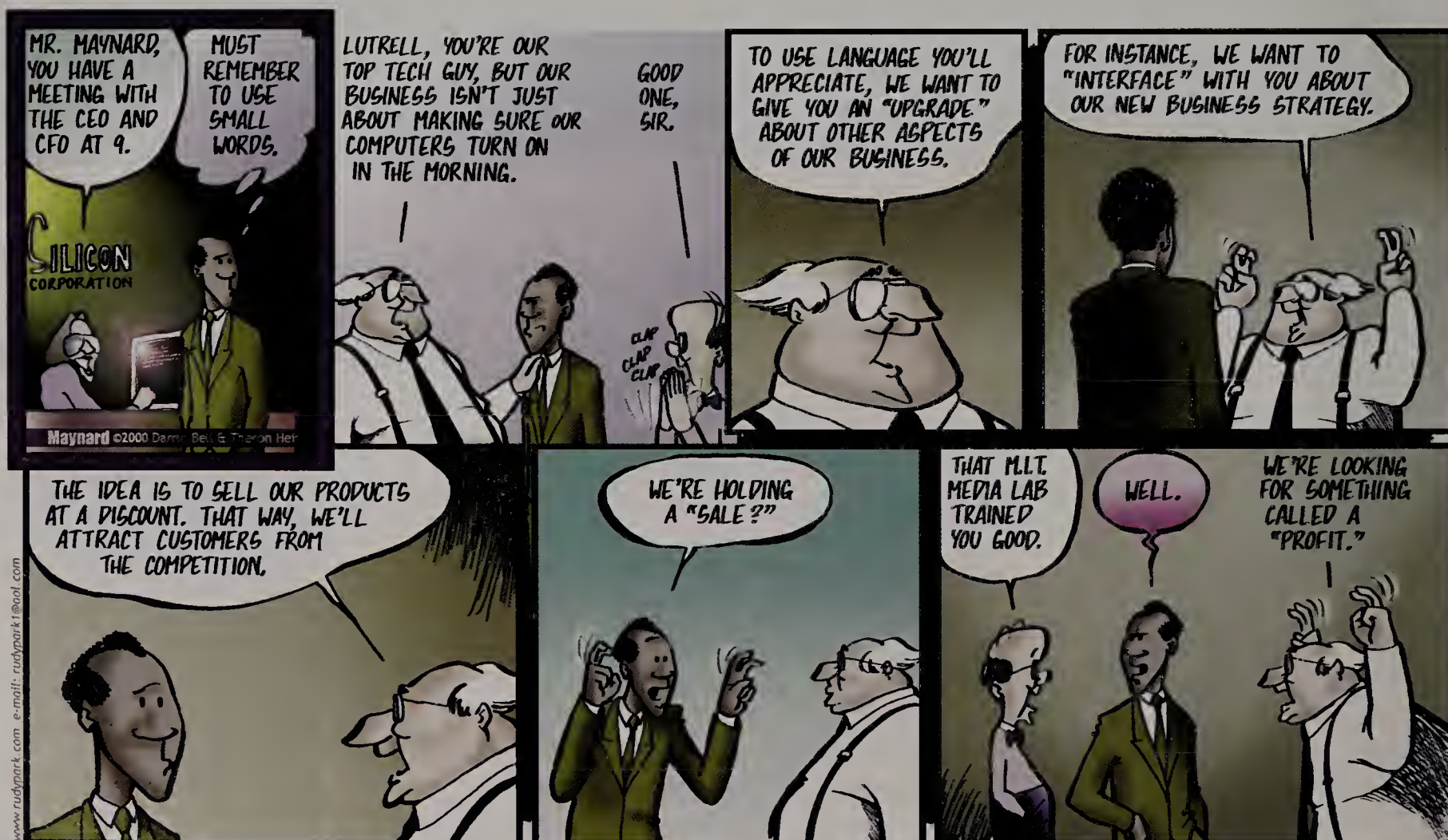
Jackson taught this course for four years in the usual, nonvirtual way, and she says the online version actually works better for students who aren't particularly drawn to more traditional offerings like volleyball, basketball and flag football. "Students get to choose the activities they want," she

says. "If they don't like to run laps, they can Rollerblade, ice skate or surf. This is a really important advantage, in my opinion, because my goal is for them to find a physical activity that they will continue to do long after this course is over."

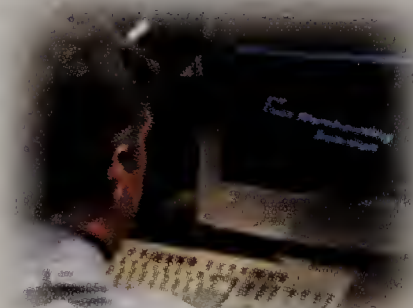
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By the Numbers

By
Derek Slater

Supply Chain Performance

Delivery Performance to Request

The **percentage of orders** that are fulfilled on or before the customer's requested date.

Upside Production Flexibility/Material Availability

The **number of days** required to achieve an unplanned sustainable 20% increase in production.

Total Supply Chain Costs

The **total cost as a percent of sales** to manage order processing, acquire materials, manage inventory and manage supply chain finance, planning and MIS costs.

Cash-to-Cash Cycle Time

The **number of days** between paying for raw materials and getting paid for product, as calculated by inventory days of supply plus days of sales outstanding minus average payment period for material.

	Delivery Performance to Request	Upside Production Flexibility/Material Availability	Total Supply Chain Costs	Cash-to-Cash Cycle Time
Computers & Electronics	94.3	72.6	4.3	30
Consumer Packaged Goods	97.6	81.2	8.3	42
Defense & Industrial	97	68.9	10	30
Pharmaceuticals & Chemicals	99	79	6	30
Telecommunications	93.9	77	2.6	25.5

Supply Chain Best Practices

1. Delivery performance to request. Implement order-tracking systems that can compare requested versus actual dates at the line-item level. Use these tracking systems to give customers a better view of inbound orders, possibly as an e-commerce service.

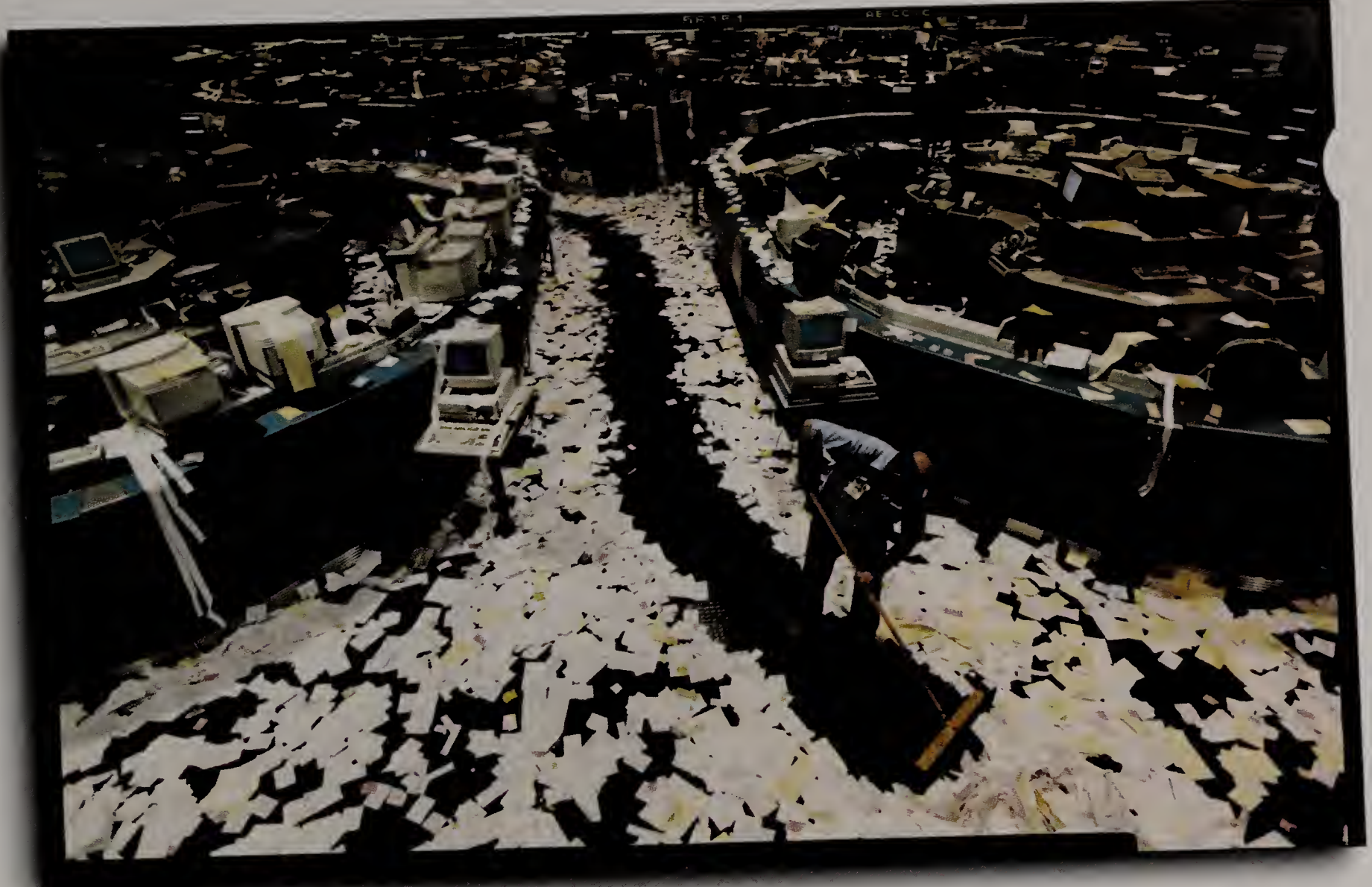
2. Cash-to-cash cycle time. "We find this metric of great value, and we emphasize it," says Todd Ackerman, director of The Performance Management Group (PMG). "I estimate that only one-third of the companies I encounter have any notion of it at all. The CIO can help create a dashboard, a series of metrics, that drives the organizational behavior required to optimize the business model. These processes are cross-functional by nature, and many IT systems are not designed to measure in that way."

3. Online purchasing. Implement online purchasing and EDI to reduce the time and overhead needed to process paperwork. A "pay on receipt" approach for selected products can minimize time-consuming matching and reconciliation of customer invoices.

"We're seeing smaller companies moving to XML-based technologies for online purchasing. These tools are sufficiently simple to provide a rapid time-to-implement and immediate benefit. The CIO has to educate his or her organization as to what these technologies are capable of doing."

—Todd Ackerman, PMG

SOURCE: THE PERFORMANCE MEASUREMENT GROUP (PMG), A SUBSIDIARY OF PITIGLIO RABIN TODD & MCGRATH (PRTM). BASED ON A TWO-YEAR BENCHMARKING STUDY OF MORE THAN 110 PARTICIPANTS. FOR MORE INFORMATION CONTACT PMG AT 781 434-1470 OR WWW.PMGBENCHMARKING.COM.



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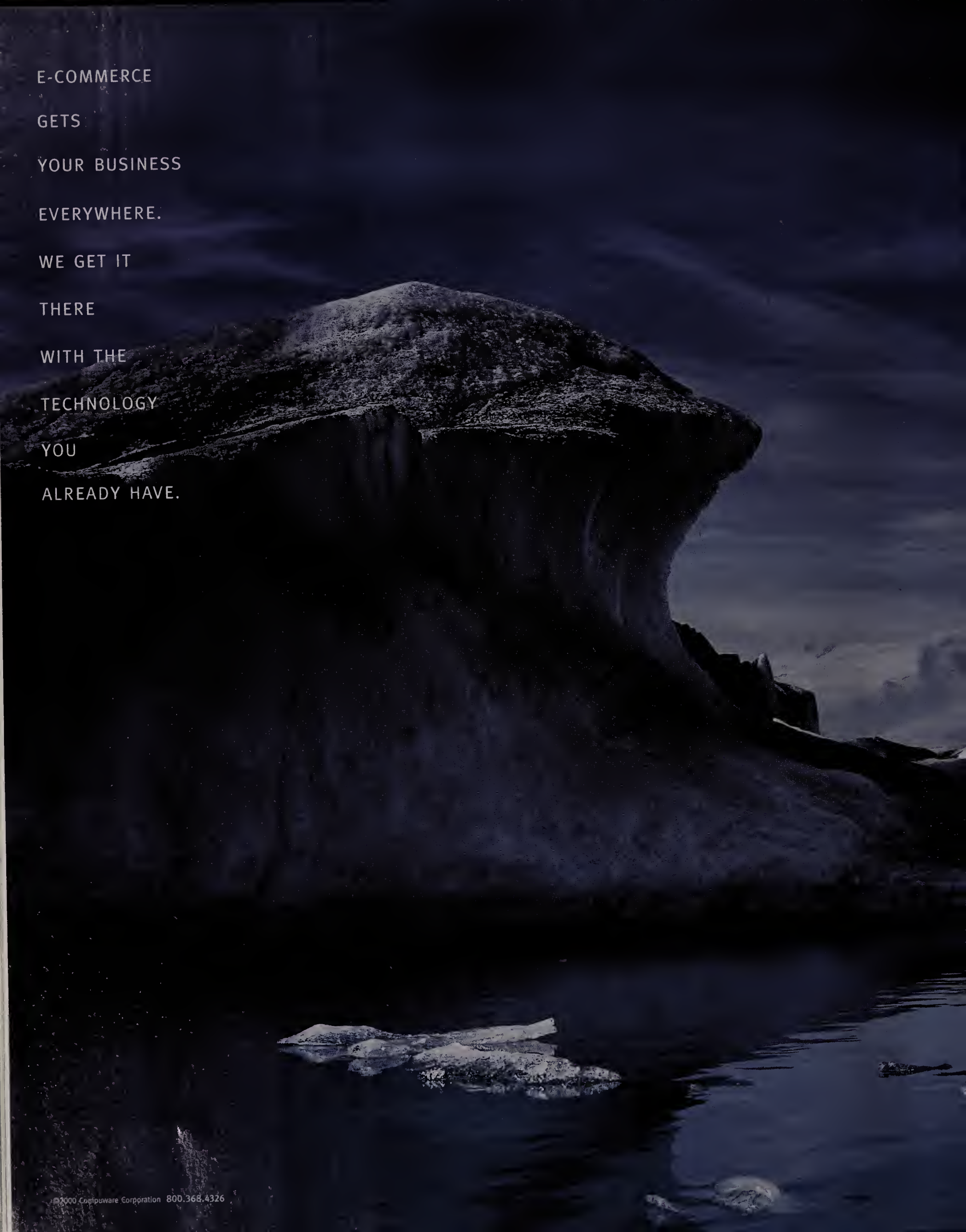
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S E C U R I T Y

Open Sesame

IN THIS COMPUTERIZED, security-conscious era, it's not too big a stretch to say that passwords practically run our lives. We have passwords for our computers, for individual software programs, for websites, for voice mail, for banking...and it doesn't stop there. Keeping track of them all is becoming a daunting challenge.

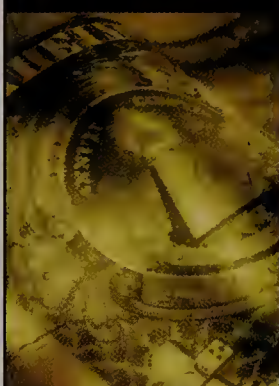
Well at last, there's help for the password-weary. EmmaSoft's Darn! Passwords! is a Windows utility that remembers all your computer passwords for you. You remember just one password, and that lets you in to the Darn! Passwords! "safe," in which all the others



are securely stored. When you want to open a protected program or website, Darn! Passwords! supplies the correct password to get you in.

Priced at \$14.95, Darn! Passwords! can also be accessed used by multiple users. For more information, visit www.emmasoft.com.

HOT TOPIC



E-COMMERCE

Patents for Sale

By Sari Kalin

Like many inventors, Nir Kossovsky and Alex Arrow want to build a better mousetrap. The difference is that their mousetrap aims to make it easier for companies to buy and sell the rights to each other's mousetraps.

Kossovsky and Arrow, along with Bear Brandegge, are founders of The Patent & License Exchange

(PI-x.com), an online exchange for intellectual property based in Pasadena, Calif. The exchange offers a secure, anonymous, neutral forum to buy, sell, license or resell the rights to patents around the world. "This is a business that, absent the web, could not exist," says Kossovsky, the exchange's chairman and CEO.

Traditionally, Kossovsky explains, buying or selling intellectual property has been an inefficient endeavor. In a typical deal, a seller might be a small biotech company that has patented a technology but doesn't have the resources to develop it; a buyer might be a Fortune 500 pharmaceutical giant seeking access to new technology from outside its own R&D labs. Buyer and seller would try to find each other through a patent broker, who facilitates technology transfer in exchange for a cut of the proceeds. But the marketplace is fragmented, and a given patent broker may complete only a few deals a year. At PI-x.com, Kossovsky aims to aggregate buyers and sellers around the globe into a searchable database.

The difference between PI-x.com and other web-based searchable patent licensing databases is that PI-x.com can actually process transactions, says Arrow, PI-x.com's vice president of financial operations. It also offers tools to facilitate the transaction and cut down on risk, including patent validity insurance, escrow services and a suggested pricing system. These services will turn intellectual property into a liquid asset, he says, much the same way the Chicago Board of Trade turned wheat, rice, corn and other commodities into financial instruments.

PI-x.com charges nothing to list technology; when transactions close, it takes a fee of 5 to 12 percent of the transaction value, based on the size of the transaction. (That's similar to the revenue model used by other business-to-business marketplaces.) For now, those fees are what is stopping Katharine Ku, director of Stanford University's Office of Technology Licensing, from using the service. But, "if PI-x.com proved to be a really effective means of transferring technology, we would consider it," says Ku, whose office maintains a searchable database of its own licensable technologies on its website. Other buyers and sellers have apparently not had such hesitations—by last November, Arrow says, more than 100 companies had already agreed to sign up for the exchange.



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THE ENVIRONMENT

What a Waste

By Sara Shay

REDUCE, REUSE, RECYCLE. Schoolchildren are familiar with this environmentally conscious motto, but much of corporate America still doesn't get it. Peter Senge, author of the best-selling book *The Fifth Discipline: The Art and Practice of the Learning Organization* (Doubleday, 1990), is the chair of the nonprofit Society for Organizational Learning (SoL), which recently started a sustainability consortium to address the issue of environmental responsibility in industry. We asked him why sustainability is such a big issue and what members of the consortium are doing to promote it.

Q: How conscious are we of the relationship between industry and the environment?

A: The Industrial Age as a whole has been a process of harvesting natural capital and social capital to produce financial capital. We really pay no attention to a whole set of consequences. Waste is an artifact of the Industrial Age. Nature produces no waste whatsoever—everything that is a byproduct of one thing is a nutrient to something else. Nature is completely efficient in that way. In America, 200 times each person's body weight per day is extracted from the earth to make products. Ninety-nine percent of that, by weight, will end up as waste. We have this incredibly ironical industrial world where everybody is going crazy measuring productivity and efficiency by output per man hour and return on investment, and we run the most inefficient system that humankind has ever conceived of in terms of the natural environment: 1 percent efficiency.

What is the goal of the SoL consortium?

The basic idea is to foster deep collaboration among different organizations on what are really transcendent issues. [The consortium] gets

Continued on Page 46

INNOVATION

It's a Lean, Mean Inventing Machine

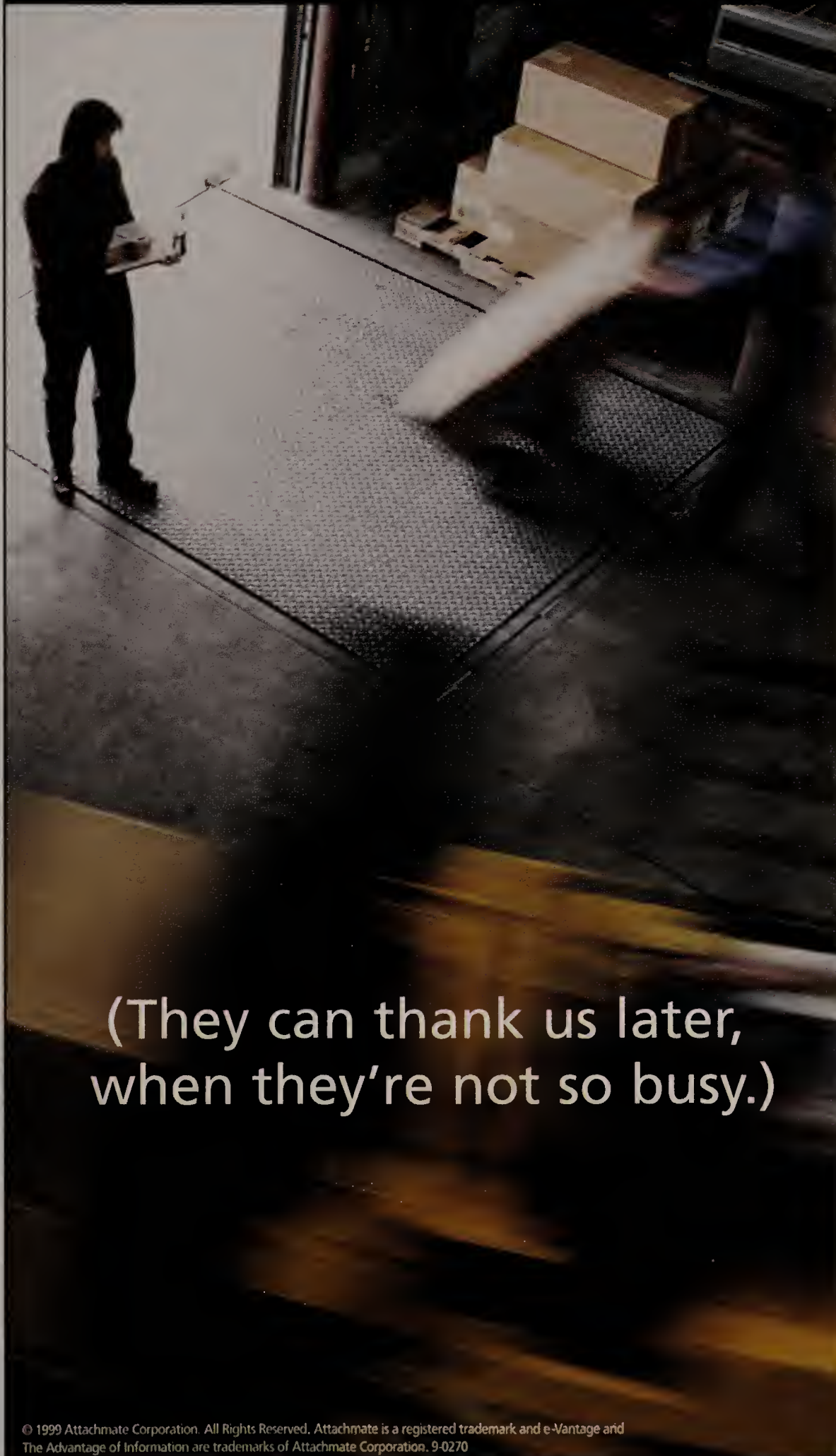
If your R&D department has been a little behind developing new ideas, and the continuous supply of fresh doughnuts and Starbucks coffee isn't helping, you might want to check out some software from Boston-based Invention Machine Corp. The company's knowledge-based innovation tools target product development in the engineering, scientific and R&D areas. The brainchild of Invention Machine Chairman and CEO Valery Tsourikov, the company's flagship software, CoBrain, addresses the problem inherent in today's exhaustive process of innovation: the difficulty of finding and extracting technical knowledge from multiple and expanding information sources like the internet and company databases.

"Access to high quality knowledge is a pain," says Tsourikov, who has worked on semantic processing for nearly 20 years and received a patent on his innovative algorithm. "We have a pain killer."

At first glance, CoBrain might sound like a souped-up search engine. But CoBrain doesn't search at all. Instead, it uses semantic processing technology to extract key concepts from company databases, intranets and the internet. The software reads the content, creates a problem-solution tree and delivers an abstract listing the technical content in relevant documents. The web-based software runs on a company's server; users access it right from their web browsers. So, for example, a researcher looking for help in fighting noise might find that rear suspension, foam rubber and gas bubbles all absorb noise. From there, she can go get whatever data she thinks will best help her.

Pricing for CoBrain starts at \$250,000. For more information, call 617 305-9250 or visit www.invention-machine.com.

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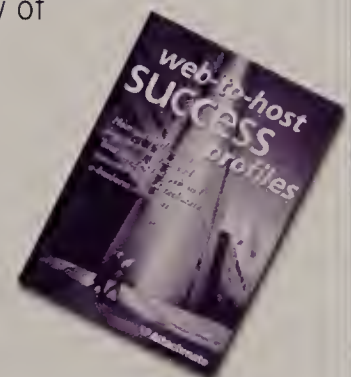
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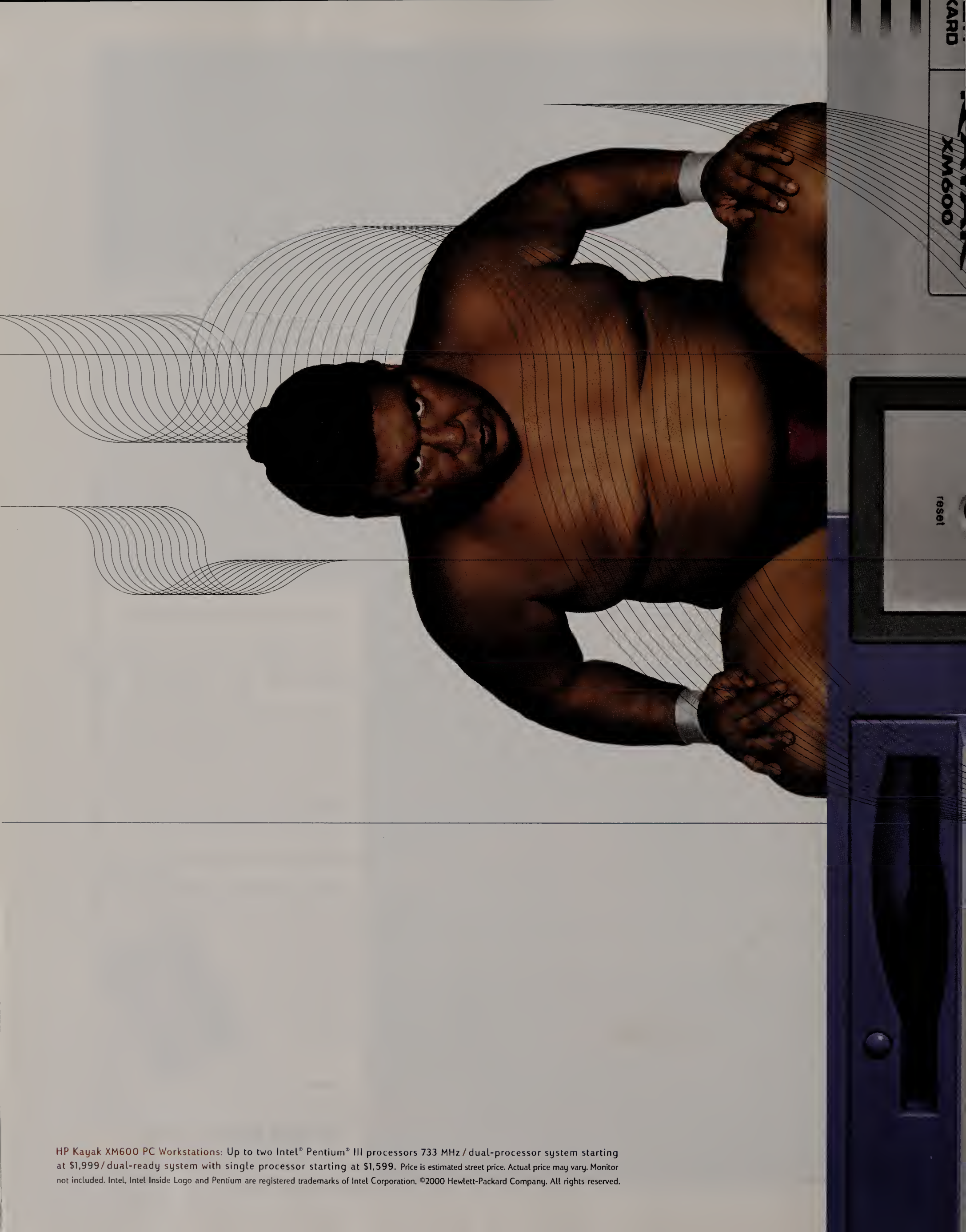
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FUTURE TENSE

“Rather than the march of technology, a better description might be the flat-out, adrenaline-pumped, anaerobic sprint of technology.”

—Carly Fiorina, now president and CEO of Hewlett-Packard, speaking before the Commonwealth Club in San Francisco in July as group president of Lucent Technologies

What a Waste!

Continued from Page 42

companies together who have already begun to see environmental sustainability as a cornerstone of their business strategy.

How are these companies adjusting their strategies to benefit the environment?

Interface, for example, is a leading manufacturer of commercial carpeting. Their business vision is to never sell another carpet. They want only to rent carpet and achieve 100 percent recycleability. When you're through with the carpet, they will come and pull it up and give you a new one. The old one, meanwhile, gets recycled. The conceptual breakthrough is that you don't care about having a bunch of nylon on your floor, you want warmth, aesthetics, acoustics—you want services, not products. They're no longer selling you a thing, they're renting you a thing that produces the service. This is a transformation of the industrial business model.

For more information about SoL, visit www.sol-ne.org.

HOT TOPIC



LEADERSHIP

Time Crunch

By Polly Schneider

Being a good leader depends not just on skills and techniques, it also requires time. Without that, it's hard to be effective at much of anything.

Personal productivity consultant David Allen, based in Ojai, Calif., has helped companies and individuals be more

efficient for the last 20 years. He shares a few thoughts on how to reduce the stress of information overload.

Q: Is the problem of time management getting worse?

A: Fifteen years ago it was more self-evident when work was done and people could go home. It's incrementally getting worse, and that's why the simpler models haven't worked. I can fill a big landfill with all the partially used PalmPilots, day runners and Franklin planners I've uncovered in people's desks. Most people don't know how to use these tools.

Is the spread of technology—e-mail and the internet—the source of the problem?

What technology has done is grease the skids. IT is just increasing the bandwidth and the speed of information. What we don't

have is people trained to define the edges of their job and how to process information rapidly.

What's a common mistake?

Emergency scanning the e-mail and not making any decisions. As soon as the inbox gets to be more than a screenful, you need to file it, print it or delete it. Most people keep looking at it and thinking about it and shuffling the stuff around. People are doing a lot of thinking about what they ought to be thinking about and feeling bad. It's not so much time as it is mental distraction and stress. A lot of what I teach is the thinking process—the intense 15 to 20 seconds you need to spend on an e-mail to decide what it is: Is it something I need to act on, and, if so, what's that action?

So what are some first steps to get organized?

First, write everything down—every open loop—and throw it in your in basket. If it's in your head, it's in the wrong place. Second, don't just leave it there. Go back and ask yourself what you need to do about it. Then put the results into some system that you trust and that you review regularly. Learning to train yourself in processing time is part of your work.

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Movers & Shakers

Compiled
by Tom Field

Deasy Switches Trains from GM to Siemens...

DANA SCOTT DEASY, formerly CIO of General Motors Locomotive Group (GMLG), recently was named vice president and CIO of Siemens Corp.'s U.S. operations.

At GMLG in La Grange, Ill., Deasy was one of 22 divisional CIOs under the leadership of GM corporate CIO Ralph Szygenda. He made news in 1998 as the first of GM's divisional CIOs to break the company's long-standing outsourcing relationship with Electronic Data Systems

(see "Shop Talk," *CIO*, Aug. 1, 1998).

Now at Siemens in New York City, Deasy is the first-ever corporate U.S. CIO, and he is in charge of a combination of 25 divisional and regional CIOs throughout the Americas. The challenges, says Deasy, who started the new job last October, arise from the size of the company and the scope of the work. "Siemens encompasses everything from medicine to automotive to financial services...there are over 20 different Siemens operating companies in North America alone," he says. "And each of them has a CIO." Which leads to Deasy's other challenge: coordinating the efforts of all these IT chiefs. "How do we leverage our size?" he says. "How do we find common ground?"

So far, Deasy has spent 75 percent of

his time traveling to meet all those CIOs, CFOs and CEOs as well as laying the groundwork for his two initial projects: develop a common e-commerce business transaction platform for all of Siemens' business units and start negotiating enterprisewide contracts with IT product and services vendors. "Every [division] has been doing its own thing, but we want to start to take advantage of our [corporate] size in leveraging deals with suppliers and outsourcing arrangements," Deasy says.

Prior to joining GMLG, Deasy was director of IS at Invetech Co. in Michigan; before that, he was director of information management at Rockwell International in California. He has a BS in business administration from the University of Southern California and an MBA from National University in San Diego.

Siemens Corp. is the holding company for the Siemens operating companies, subsidiaries and other legal independent entities in the United States. Siemens U.S. companies had sales of over \$10 billion and employed 65,000 people in 1998. Based in Munich, Germany, Siemens AG operates in over 190 countries, employs 400,000 and had 1998 sales of nearly \$70 billion.



CIOs on the Go...

John Buckman → **Cysive**
spent 32 years managing IT in federal government; plans to establish a scalable network and manage data flow for the Reston, Va.-based e-commerce vendor

Michael P. Cody → **Mobile America**
fresh from a consulting engagement at First Floridian Auto and Home Insurance Co. in Florida, Cody joins Mobile America as CIO for the insurance company and its subsidiaries

David Henke → **AltaVista**
formerly CIO at AltaVista's Zip2 Local Portal Services division, Henke has been promoted to CIO of all of AltaVista; he directs production and internal operational infrastructure

B. Lee Landers Jr. → **Aaron Rents**
formerly manager of customer service systems for the Southern Co. in Atlanta, joins as the furniture/appliance company's first-ever CIO

Nicholas L. Loli Jr. → **A&P**
a 25-year IT veteran, has traded in his CIO position at Citizen Utilities for a similar role at A&P in Montvale, N.J.; Loli will help business leaders develop and implement the retailer's IT strategy

Terence V. Milholland → **EDS**
ex-CIO of Boeing, is now senior vice president and CIO for EDS in Plano, Texas; he replaces acting CIO Dan Leffel; Milholland will be charged primarily with implementing a new enterprisewide information system

John L. Puckett → **Toysmart.com**
leaves GTE Internetworking Services, where he was CIO, to be CIO of online startup company Toysmart.com; Puckett directs the entire technology operation at the new Waltham, Mass.-based toy retailer



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ADAPTIVE TECHNOLOGY

Seeing It Their Way

AS TECHNOLOGY ADVANCES, companies need to make sure their own progress doesn't stand in the way of the visually impaired. Otherwise they can expect to be hauled into court. Recent proof: The National Federation of the Blind's suit against AOL, filed last November, claiming that the company violates the Americans with Disabilities Act of 1993 (ADA), because its services are not compatible with programs that convert text into speech or braille.

To make ADA compliance a little easier—and to help the visually impaired participate more fully in technology-related careers—some companies are designing specialized products. Richmond Hill, Ontario-based Adaptive Innovations, a division of Trango Software, for example, recently launched BrailleStream, software that communicates call center data to sighted and visually impaired agents simultaneously. The visually impaired agents receive messages and statistics via an integrated voice synthesizer or braille display, in real-time. With this technology, call center agents with vision problems can operate as efficiently as their sighted counterparts. The software can be integrated with existing call center applications. Find out more at www.adaptiveinno.com.

To make sure that the visually impaired can withdraw the money they earn, two financial institutions are beginning to invest in automated teller machines that don't require users to read the screen. Though most machines have braille instructions, fewer than 10 percent of the legally blind in the United States read braille. After being approached by the California Council of the Blind, Wells

Fargo and Citibank have begun supplying talking ATMs on a pilot basis in California. Wells Fargo installed 20 talking ATMs in the Bay Area, and in Los Angeles and San Diego counties last summer, and plans to add more than 1,500 across the state in the next three years. The machines give voice instructions to users via audio jacks and headsets so that transactions can't be overheard. Citibank's machines, five of which debuted in October in San Francisco and Los Angeles, offer touch screens and audible instructions.

—Sara Shay



E - C O M M E R C E

Are You Ready for VD2K?

Valentine's Day 2000—also known as VD2K among those in the technological know—is right around the corner. Are you prepared?

You could shower your loved one with chocolates or flowers, but how original is that? Heck, this is a new millennium!

How about an online video card? At CardsAlive.com, a new, online greeting card site created by Cresta Systems in San Jose, Calif., you can create and star in just such

a card. All you need is a digital camera: Download the free CardsAlive technology, shoot your video clip, upload it to the CardsAlive.com site and begin to build the card. Once your card is complete, enter your loved one's e-mail address; the site will send him or her a message with instructions on where to find the greeting card. If you don't have a digital camera, CardsAlive.com has a library of more than 100 ready-made video clips, free of charge,

to choose from instead.

The video card technology converts heavy bandwidth formats to a small, self-executable object 100KB to 150KB in size. Since the bandwidth shrinks, anyone can execute the video greeting card on a desktop without plug-ins or special software.

CardsAlive.com provides more than 25 different greeting card categories. To use your own personal videos, a fee of \$9.95 buys a one-year membership, but the company also offers a free trial membership for the first 30 days. For more information, visit www.cardsalive.com.

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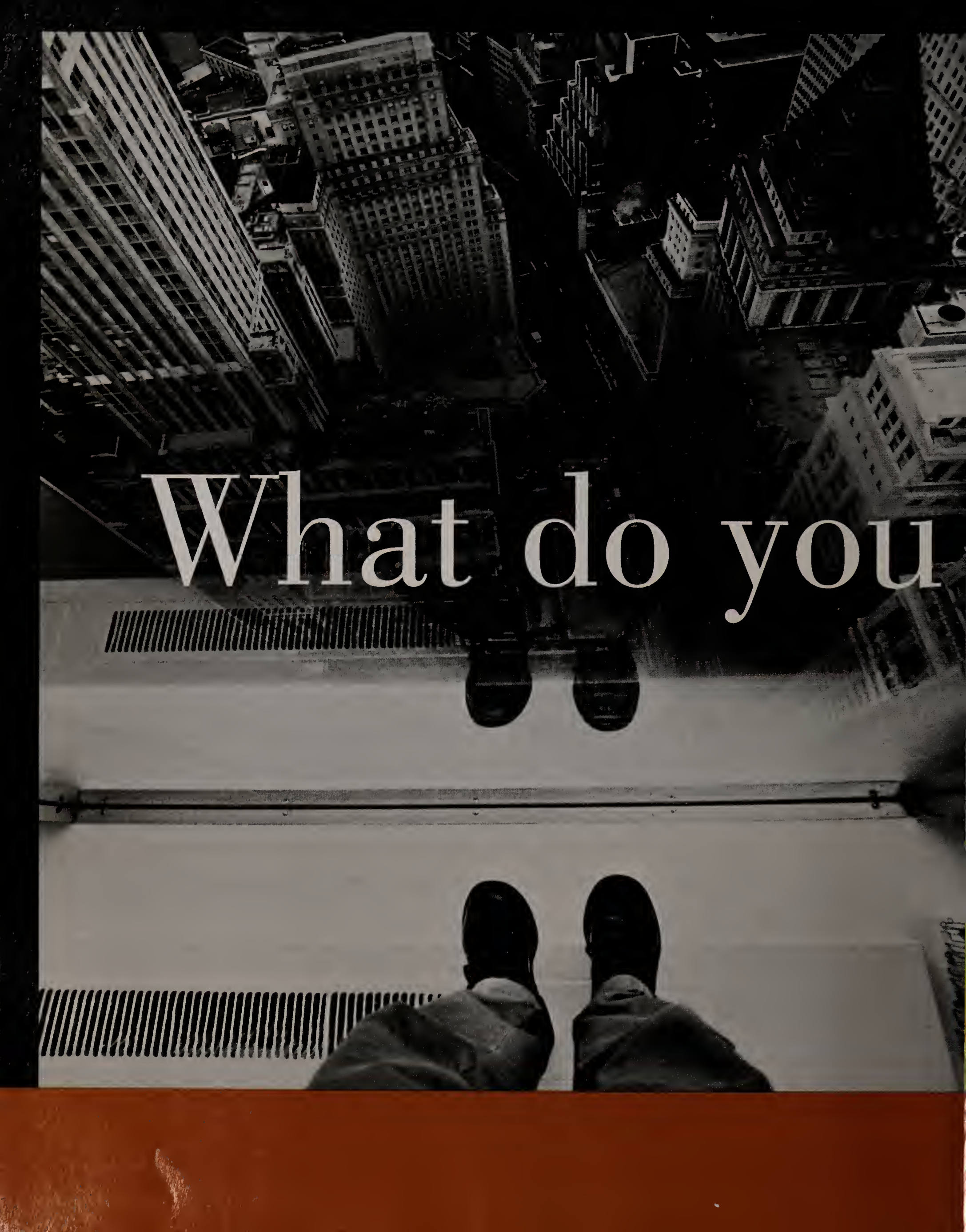
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Squaring Off

Few of us enjoy confrontation, but this is no time to be squeamish—you need to have a plan

BY PATRICIA M. WALLINGTON

PICTURE THIS: YOU ARE ABOUT to enter a meeting of the most senior executives in your company. You're going to propose a drastic reduction in the systems enhancement budget for each of their departments in order to fund some new development activity. You know they will hate this proposal. How will you handle the inevitable confrontations looming in front of you?

I was faced with just this situation as the relatively new CIO in Xerox's U.S. Marketing Group in 1991. Later I'll share with you the strategy I chose and why it was successful. But first let's agree that confrontational situations make most of us uncomfortable, understand why confrontation is important in honing our leadership skills, and identify some strategies for successful confrontation and some things to avoid.

The CIO position, more than most others, is rife with confrontation. It is the hub of change in most companies. So it behooves the CIO who values his or her position to become an expert in the art of confrontation.

How can you be more successful in these difficult situations? While certainly not a formula, nor all-inclusive, the following principles have been helpful to me and some of my colleagues.



Anticipate. Don't walk blindly into confrontation. Sometimes it will be thrust upon you, but most often insightful thinking will tell you to expect it. Prepare a strategy to deal with it.

Confront the issue, not the person. Most disagreements are driven by honest differences of opinion. Confrontation does not mean personal attacks or unprofessional behavior. Staying with the issue is important if you want to achieve resolution and maintain or grow the relationship. Never personalize the arguments. Confrontation does not have to be confrontational.

What do you do if the other party engages in personal attack? Years ago I worked with an executive who was constantly on the attack. Boy, if I said up, he said down, and not gently.

First, don't respond in kind. Stay cool and professional, and hold your ground—but always be on guard for his attacks. Recognize that most times people like that succeed only in making themselves look bad.

ILLUSTRATION BY AMANDA DUFFY

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Total Leadership

Second, in the background, try to find out what the problem is so that you can better anticipate what position he'll take and be prepared with the appropriate facts. Talk to people he trusts or those with whom he has a good relationship.

Third, treat it as an advantage. Ask yourself, "What will X say about this?" Often, doing this makes you take the extra step to think things through.

Fourth, engage the person. One day I had the opportunity

Confrontation does not have to mean personal attacks or unprofessional behavior.

to talk with my nemesis (I took as many of those as I could get) when he was in a relaxed mood. Jokingly, I told him my goal was to get a gratuitous comment from him some day. Things improved after that discussion. Why? Perhaps my comment communicated that I cared, that I was listening and that I was willing to earn his respect. It was hard work and it took a long time, but I finally did get the gratuitous comment and what I would classify as grudging respect. You never know what will change the tide. Don't avoid these contacts.

Seek understanding. Your goal should be to understand each other. Don't be defensive; do listen carefully. What is the real issue?

Is there anger? Frequently, proposed changes are interpreted as criticism of the existing way of doing things. This is particularly true if the person you're dealing with was the author of the status quo.

Is there fear? Is there a threat to the current status or power of the person? Many times reorganizations or the introduction of new technology that will change the roles people play will generate this type of reaction.

Is there ignorance? Are the facts well understood by both parties? Maybe they know something you don't.

Knowing the real issue is helpful for several reasons. You may be able to redress the issue by some change in the plan. You may be able to provide clarifying information, which tends to mitigate the issue. But even if the issue remains, most times, constructive dialogue has brought the parties in the confrontation to a better meeting of the minds. You may not agree, but you understand and honor each other's position.

Get help. Now is not the time for maximum independence. Solicit help from mentors, coaches and bosses. Some of us have a difficult time asking for help. Yet,

everyone I have ever asked for help has come through with good, thoughtful advice, and they liked being asked.

One of the most effective tools for confrontation is the use of a professional facilitator. It is particularly effective when the confrontation involves a number of people, such as on project teams. At Xerox I was lucky enough to have a very talented staff member who was able to accomplish some amazing breakthroughs with this technique.

Be generous. Be generous of spirit throughout the process. At its end, give credit liberally to those who helped make it successful, no matter how small the part they played or how grudgingly. Credit is so easy to share; only blame is hard to allocate.

Win the war, not the battle. I don't generally like war analogies, but this advice was given to me early in my career by one of my favorite bosses and mentors: Every issue is not equally important. It will be necessary to choose those important enough to warrant using your political capital in the confrontation. Everything will seem crucial today, but will it still be important one or two years from now? Hone your judgment and critique your own choices.

Now let's go back to the situation I described in the opening paragraph. I knew I was going to face a hostile group. They probably agreed it was necessary to take the action I was proposing, but it was going to be extremely painful to implement in their groups. I tried to think of some way of letting them know that I understood the difficulty and was willing to help. When they arrived for the meeting, at each of their seats was a gift bag all nicely done up with tissue paper and bows. It contained a small monogrammed towel—The Crying Towel—to be used when consoling members of their organization suffering from the embargo on enhancements.

What did this do? It defused the situation, eased the pain by bringing a little shared humor to a tough problem and showed some empathy for the difficulty they would be facing.

My recommendation was approved, and the towels got lots of use. Some VPs even used them, symbolically, for other issues they were facing.

Now, confronting the end of this column, I remind you of that famous homily: "Leaders are like tea bags. The longer they are in hot water, the stronger they get." Good luck. **CIO**

Before retiring in 1999, Patricia M. Wallington was corporate vice president and CIO at Xerox Corp. In 1997 Wallington, now based in Sarasota, Fla., was inducted into the Women in Science and Technology Hall of Fame and named by *CIO* as one of the decade's 12 most influential IT executives.

Have you got a confrontation war story? Tell us about it or share your thoughts about our ongoing Total Leadership Column at leadership@cio.com.



PHOTO BY FURNALD/GRAY

Find Out More

For more on conflict and confrontation visit www.printlinks.com for an exclusive article on the topic by Kenneth Cloke and Joan Goldsmith, authors of *Resolving Conflicts at Work: A Complete Guide for Everyone on the Job* (Jossey-Bass, 2000).

For more advice on the topic of leadership in general, visit *CIO*'s Leadership Research Center at www.cio.com/forums/leadership.

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Sticky Business

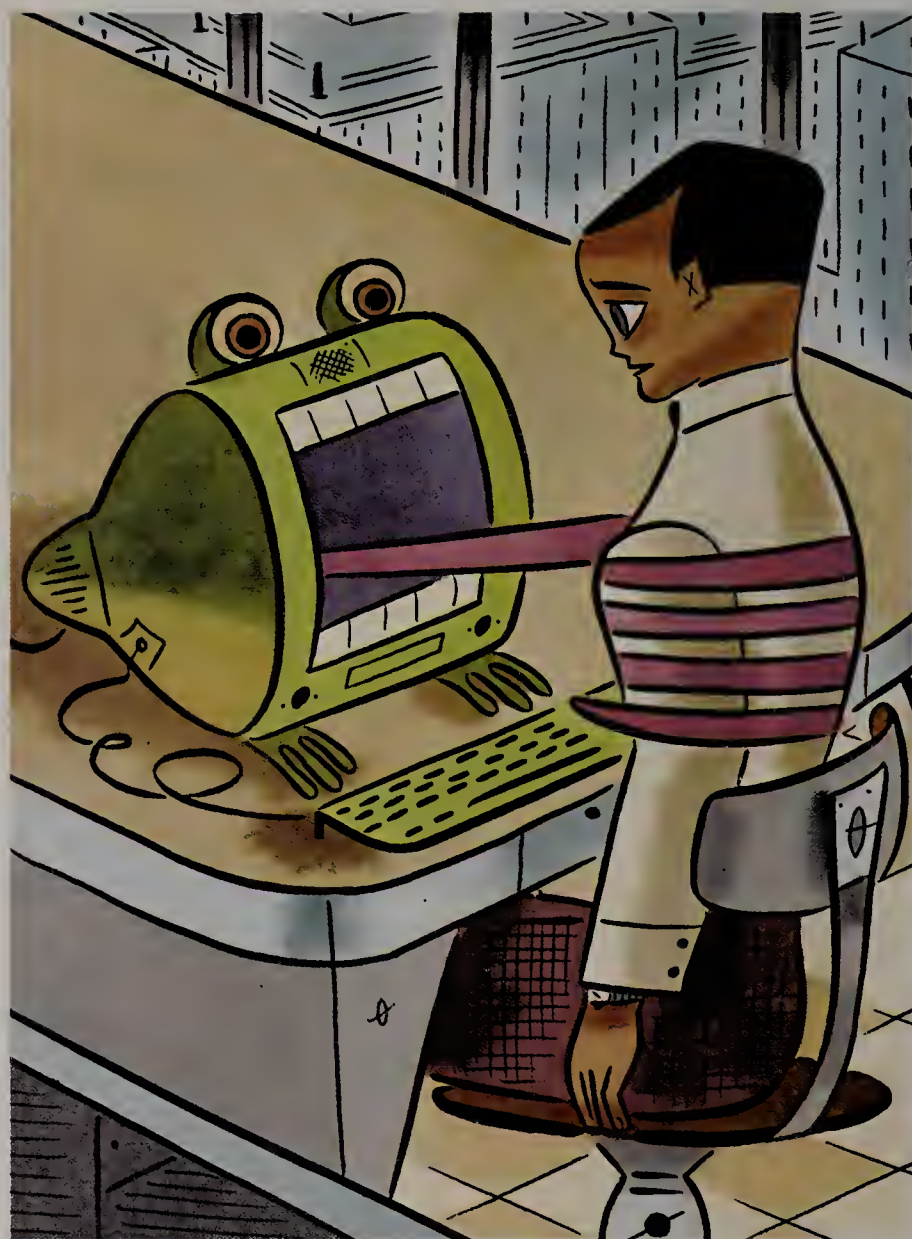
It doesn't matter how interesting your information is if nobody's paying attention

BY THOMAS H. DAVENPORT

THE IDEA OF "STICKINESS" is one of the most important ideas in electronic commerce—and business in general. In e-commerce, it's a measure of how much attention a website receives over time. In the information technology world, it's the first indication that we are focusing not just on information distribution but on usage as well. It shows we realize that if someone is going to be affected by information, they've got to devote some time and attention to it. In the web world, stickiness is currently measured because of its impact on the viewing of internet advertising. But the concept has much broader application. In fact, anyone with any information on the web today should be thinking about stickiness. If it isn't sticky, your website and the strategy behind it are almost certainly failures.

What Is Sticky?

Even though stickiness is a relatively new concept, there's already some disagreement about what it means. Some argue that the stickiest sites are those with the longest average time per visit; others point to the importance of retention or of visiting a site often. To me it doesn't matter much whether view-



ers visit less often for longer periods or more often for shorter durations. The key in today's measurement environment is the overall number of minutes a viewer devotes to your site over a given time period, say a month. That's what Media Metrix, a web viewer behavior-measurement company, assesses. Perhaps in the future we'll have measures of what percentages of brain waves a sticky site is able to attract. For the moment, however, we're stuck with measuring how long a site is on your screen.

Of course, there are ways to game the stickiness system, some difficult and others simply clever. One reason that AOL can report high stickiness levels, for example, is that it's taken the trouble to build its own network and a rich content portfolio. No doubt crafty entrepreneurs are seeking easier routes to stickiness nirvana by encouraging you to leave their sites on the screen while you're doing something else that's time-consuming. If you leave a web-based TV channel guide on while

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Davenport On...

you're watching the tube, or leave a recipe site on while you're cooking dinner, the websites will look very sticky. Ultimately, however, what will matter to websites and strategies is how much actual viewer attention they attract over time.

What Makes Sites Sticky?

Below are some guidelines as to what makes websites sticky. My recommendations are based on analysis of the stickiest sites and on the approaches of leading companies in this area.

Measures matter. One secret to succeeding at stickiness is measuring the phenomenon at every opportunity and adjusting your site accordingly. Server log analysis can tell you how long

Branding is a key source of internet stickiness; with so many sites, users go for the ones they've heard of.

a unique visitor stayed at your site. If you can't use your website reporting tool to add up visit time over a month or so, get a new one. You may also want to compare your own site's stickiness to that of competitors. Unless you're a really accomplished hacker or know a traitor in your competitor's organization, you won't get this information without buying it from a web metrics company.

Once you've determined who's looking at what for how long, the key is to adapt your site accordingly. If people tend to spend the most time at web pages with a certain type of content, provide more of it. If you're not sure what your measures indicate, undertake a few experiments with content or format and monitor what happens. But if you don't measure stickiness, you won't be able to manage it.

Bet on breadth. One of the predominant strategies used by e-commerce companies to build stickiness is to create—often through acquisition—a very broad offering of content. Many of today's stickiest sites are portals, or content aggregation sites that offer a wide array of information to the browser. These sites are sticky purely because of the wide range of information options they provide. Internet users spend substantial amounts of time on AOL, for example, because it is a self-contained world of content, sometimes rivaling the entire internet for breadth of information offerings.

Let us entertain you. Some of the stickiest sites of all involve entertainment. To paraphrase P.T. Barnum, nobody ever went broke overestimating the desire of internet users for entertainment. Kids and adults spend hours online playing games of various types and monitoring noninternet forms of entertainment such as sports and movie review sites. Even if your primary purpose on the internet is serious, you can still entertain your viewers with quizzes, amusing content or chat. And as band-

width to homes and businesses increases, we'll increasingly see movie and television-like dramas on our PCs.

Change content early and often. Perhaps the single most important factor in achieving stickiness is rapid changes in content. But changing content is a labor-intensive proposition. One way to get around this problem is to rely on others to change your content. The source could be providers of content that changes frequently by its nature, such as news, weather, sports scores and stock prices. Some sites rely on the users for changing content—auction sites, for example, can generally count on customers to rebid often, which leads other users to check their own bids. Sites that offer lower prices as more buyers sign up also provoke frequent rechecking of current price levels.

You can buy stickiness. Love may not be for sale, but stickiness is. Perhaps the most straightforward way to get people to look at your content is to pay them to

do so. This is the business model behind an increasing number of sites that offer money, gifts, airline miles, computers and internet service to customers who simply agree to view (and in some cases click on) ads. Another particularly sticky strategy is to offer free e-mail, as the sticky sites Hotmail.com and Netaddress.com have done.

The web is not enough. Branding is a key source of internet stickiness; with so many sites out there, users go for the ones they've heard of. And the way you become heard of is not just by making your undoubtedly excellent content available on your web server. You've got to advertise, preferably in as many media as possible. Suffice it to say that a number of dotcom companies spent multiples of their annual revenues to buy 2000 Super Bowl advertising spots. You could argue that this is another (very expensive, but probably worth it) way to buy stickiness in the marketplace.

Stickiness is critical on the internet, but it's also important for all forms of information in your organization. Whatever medium you're working with, you should begin to think about how you measure whether anyone's looking, how you can increase the breadth of information you offer, how you can make the source more entertaining, how often the content changes and how you might exchange something valuable for your viewer's attentive brain cells. You can view the web and the internet as practice for a world in which stickiness wins. **CIO**

Thomas H. Davenport is a professor of management information systems at Boston University School of Management, director of the Andersen Consulting Institute for Strategic Change and a distinguished scholar in residence at Babson College. He welcomes reader comments at davenport@cio.com.

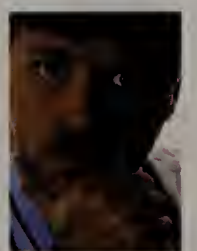


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This year's Enterprise Value Award winners have discovered that, by looking beyond the bottom line, they can reach for the stars

BY ELAINE M. CUMMINGS

In Search of Excellence

Edison. Ford. Wright. They are revered as people who have made a difference in the world, and they stand out not just because they dared to think, but because they dared to act. Sometimes they had to go it alone; sometimes they had a cadre of believers to share their vision. Often they stumbled. But in the end, they held tight, persevered and eventually reached their proverbial peaks.

• This Year's WINNERS

Trade Secrets

70

Schwab's Internet Trading Customer Center enables customers to do for themselves what they used to pay a broker to do. More than a convenience, this web-based service is a money saver for Schwab and its customers.

By Tom Field

Basic Training

80

The U.S. Army, with its Internet Tumor Board, uses simple technology to make a world of difference for cancer patients and their doctors at remote Pacific military hospitals.

By Elaine M. Cummings

Fine Line

88

Dell built a new manufacturing plant two years ago, called Metric 12, that employs work-in-progress stock-rooms, order-level material availability checking and a parts assembly system to increase production, improve inventory control and decrease employee turnover.

By Stewart Deck

Prescription Strength

94

Pfizer replaced its traditional paper-based review process with Esub, its Electronic Submission Navigator system that cut time to market, improved communication and lowered the incidence of mishap with its new products.

By Mindy Blodgett

Loan Star

100

Household Financial's Vision system is an integrated lead management, sales, underwriting and origination system for consumer loan and related products.

By Derek Slater



• Honorable MENTION

United Airlines, Elk Grove Village, Ill.

The business world revolves around big thinkers with big ideas. When such efforts go unrecognized—well, the old adage is true: The journey is often its own reward. But every so often, those accomplishments are acknowledged and shared with the world. So it is with the Enterprise Value Awards.

Each year, *CIO* honors the people behind the latest and greatest technology-enabled business achievements. These are the people whose projects have altered a core process, an organization, a market or even an industry. These are the folks who make a difference. Because of them, there is simply no point to adhering to “the way we’ve always done things.”

The winners of this award are chosen by a panel of independent judges, who consider such aspects of the project as the financial return from the initiative and the strategic impact on the organization (see “Judgment Call,” Page 108). In aggregate, the award-winners’ efforts stand out in several ways: These organizations have brought about a fundamental change, not just marginal improvements, in the way they do business; in doing so, they have raised the bar higher still. In other words, they have gone beyond fixing management-created problems—or getting credit for what one of our judges compares to “simply cleaning up their rooms.” They have achieved, in their own context, lasting value.

Of course, determining the success of such projects can mean looking at some traditional, tangible measurements: new revenue, lower costs or reduced time to market. Sometimes, in fact, they need measure nothing more than the widening gap between themselves and their competition.

But the bottom line isn’t the only way—or even the best way—to evaluate how IT adds lasting value to an organization. With the complexity of today’s enterprise projects, the basic economic model of justification is simply no longer sufficient. Success must also be measured in not-so-tangible ways. “A company uses IT creatively when

OVERVIEW: ENTERPRISE VALUE AWARDS

it uses it to overcome significant architectural, technological or cultural challenges," says awards judge Christopher Hoenig, president of Exolve and former CIO of the Government Accounting Office. "And IT innovation doesn't always have to be about leading-edge technology," he says. "I first look to see if the project captures my imagination."

Projects that capture the imagination come from organizations that are willing to invest in technology to create the future, not just survive it. Certainly, that's easier said than done. We've all seen those projects that are held together with a lot of positive energy, but the moment you turn your back on them, they fall apart. Projects

after all, if a project provides a strategic building block? How can all the risks clearly be spelled out? What is verifiable? What will persist?

Some companies, like Dell, have had to reinvent the very process that Henry Ford created back in the early 1900s (see "Fine Line," Page 88). Two years ago, when planners at Dell looked into the near future, they saw plenty of opportunity and an enormous challenge. Their forecasts showed a ravenous customer appetite for new computers that could carry Dell to new heights if they could turn out new machines quickly and with maximum efficiency. Did that mean building lots of new factories? "In some ways, Dell is allergic to too much brick and mortar," chuckles Terry Kelley, vice

loans—christened Vision, in fact (see "Loan Star," Page 100). An object-oriented system that manages the lending process from sales lead to perfected loan, Vision accomplishes several aims for Household. The company's account executives can structure and approve loans more quickly, while the system ensures regulatory compliance. Most impressive, the system includes a neural network-based learning component that helps identify the most appropriate products Household can offer to a given customer. All of these benefits add up to a closer, more comfortable link with customers. That's quite an advantage over Household's competitors in an industry that is predominantly paper-based and reluctant to spend money on technology

Projects with a lasting value—the ones that are not artificially held together—keep going because they produce more than they consume.

with a lasting value—the ones that are not artificially held together—keep going because they produce more than they consume.

Look to organizations like Charles Schwab and you see instantly how their web-based stock trading project became self-sustaining. By using technology to redefine its industry, Schwab's customers now have the ability to manage their stock portfolios from their own PCs (see "Trade Secrets," Page 70). This project was initiated by Charles Schwab himself, undertaken by senior business and IT leaders, and now it thrives because Schwab's customers not only responded to new technology, they embraced it. Suddenly, Schwab is doing more business with less overhead expense per transaction. That's lasting value.

Because it's difficult to estimate the impact IT projects will have on the future, it's not always easy to recognize their lasting value. How can one see,

president of worldwide operations I/T. Instead, Dell turned its processes upside down, completely rethinking the way to build computers. The company bought and designed what it needed to run a new type of assembly line, trained assembly line workers in new methods and hasn't looked back, except to view the competition now trying to catch up.

"Dell had to rethink the concept of a production line," says awards judge John Glaser, CIO of Partners Health-Care System. "By doing so, the company was able to increase production, improve inventory control and decrease employee turnover."

Dell is a case where it is hard to separate the technology from the process. With its built-to-order, continuous-flow manufacturing, Dell created a visionary, clean-sheet process that is now an industry benchmark.

"Visionary" also describes Household Financial's integrated system for equity

projects. "It took courage to make the investments that were counterintuitive in this industry," says judge Patricia M. Wallington, retired CIO of Xerox.

It wasn't courage, necessarily, that spawned Pfizer to create its Electronic Submissions Navigator, or Esub (see "Prescription Strength," Page 94). In fact, Walter Hauck, Pfizer's director of Clinical Systems, was new to the pharmaceutical industry, "so I didn't know that what I wanted to do couldn't be done," he says. But when Esub helped Pfizer's new antibiotic drug, Trovan, win FDA approval in record time, everyone knew instantly that they had a good thing. By banding together, researchers and IT staff built an electronic version of a new drug application—a document that traditionally could fill a truck when printed. It was that alliance that launched a whole new way of doing business at Pfizer. "The collaborative effort is a standout," says

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- Bob Leshner and Charlie Bise, Information Technology, Exel Logistics

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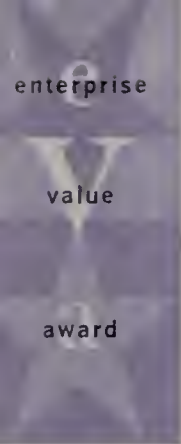
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OVERVIEW: ENTERPRISE VALUE AWARDS

Wallington. "The critical change in the process was in linking and making visible to all the complete set of information as the new product went through the various stages," she says. "I was struck by the number of parties that were involved and needed to agree before Esub could happen."

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The system has reduced the drug-review cycle by two months, eventually bringing the company more than \$142 million in revenues over four years due to a shorter review time. But beyond the bottom line, it allowed the company to support three concurrent international drug prod-

80). By using technology to connect with cancer experts at Tripler Army Medical Center in Honolulu, remote Pacific Island doctors were able to bring advanced medical care to cancer patients—and change lives by doing so.

The return on investment for such a project was hardly financial; although the program saved significant amounts of money by reducing unnecessary trans-oceanic journeys to Tripler and reduced costs related to inefficient patient handling or needless surgeries. The most important benefit came from the quality of life decisions that were made as a result. An unexpected benefit was that now remote doctors, who used to have to travel to obtain continuing medical

activities," he says. "And that's remarkable when it happens."

There's an ancient Polynesian legend about two brothers who had spent their days traveling from island to island without finding a satisfactory place to make their home. In time, the story goes, they came to a tiny harbor with a path that led upward from the sea through a halagrove to a high mountain.

"I could stay here in the hala," sighed the older brother, wearily. But the younger one was eager to move on. "This is no place to rest," he reasoned. "The vines will creep over you and cover you from sight, and the thorny

Lasting value results when there is a substantive change in a company's competitive advantage or a major leap in the organization's ability to carry out core activities.

uct teams; it enhanced Pfizer's reputation in the field, making it a desirable target for strategic alliances with competitors; and it brought IT to the business planning table in a new way as the clinicians began to see that technology could be used as a competitive advantage.

When it comes to saving lives, the U.S. Army's Internet Tumor Board is a true winner (see "Basic Training," Page

education to remain certified, can now get those credits via the Internet Tumor Board without ever leaving their island hospitals. "It's been an unbelievably helpful way to share knowledge and develop trust," says LTC Jeff Kavolius, a surgical oncologist at Tripler. "It's nice that an award like this doesn't have to be given to a corporation that made the most money. Sometimes it's important to recognize dedicated professionals who make a difference."

Not all IT projects are expected to make such a difference. In fact, most won't, says Glaser. "At Partners Health-Care, we engage in a series of projects that make modest improvements," he says, "and we hope that those gains add what I consider 'lower-cased' value—they somehow increase revenue or reduce costs. But 'upper-cased' value—lasting value—results when there is a substantive change in a company's competitive advantage or a major leap in the organization's ability to carry out core

hala leaves will scratch you as they fall. Come with me to the top of the mountain. From there, we will be able to watch the birds and the clouds and feel the wind blow. And we will see the whales and turtles swim in the ocean." But the older brother could not be persuaded, and so the younger brother went on without him.

Reaching for the stars isn't for everyone. But what motivates some to climb higher than seems reasonable to others? Is it simply the price of doing business? Or do some people have a vision that tells them their world is only a part of something much larger?

CIO thinks that this year's five Enterprise Value Award winners have somehow seen that their actions can make a difference. **CIO**

Does your company have an IT project that you think is delivering lasting value? Senior Editor Elaine M. Cummings wants to hear from you. Contact her at cummings@cio.com.

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Enterprise Value Awards on the Web

To learn more about this year's winners, visit www.cio.com/eva. See what past award recipients have to say about their award-winning experience. While online, you'll also see a completed sample application, including judges' comments, to help guide you through the initial application process.

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An online customer center executes the “buy” order and gives Schwab a leg up in the electronic brokerage marketplace

BY TOM FIELD

Trade Secrets

It all began with a call from Chuck.

It was in December 1995, at an offsite meeting of senior executives from Charles Schwab & Co., the San Francisco-based financial services company. Midway through the day-long session, the phone rang for Executive Vice President Beth Sawi. It was Charles Schwab

himself—“Chuck,” as he’s known respectfully throughout his company—and he had an order, which, typically, he framed as a request: develop an online trading system. Now, Schwab’s insistence arose not from fear—in fact, the 26-year-old company was living large off of profits from its branch offices and call centers—but, rather, anticipation. The internet was taking hold with

American consumers, and Schwab wanted to make sure his company staked an early claim in the online investing marketplace. “I want us to be up and trading online by Feb. 14,” Schwab said—six weeks away.

With those marching orders, Sawi partnered with CIO Dawn Lepore, and together they recruited a 13-person task force to tackle Chuck’s challenge. They missed the

Valentine’s Day deadline, but just barely. On March 31, 1996, Schwab’s new Electronic Brokerage group went live with an Internet Trading Customer Center that quickly changed not just how Schwab’s customers do business, but how the company’s own employees do business. From a market of none, this system, in fewer than four years, has helped Schwab seize 41 percent (in terms of assets) of the online brokerage marketplace—twice the share of E-Trade, its nearest competitor. Today, fully 70 percent of the company’s total trades are electronic, conducted by an ever-growing customer base of 2.2 million people who have instant, real-time access to account information, stock



BUY DESIGNERS Vincent Phillips (left) and Randy Goldman

quotes, incisive market research and, of course, live trading. Internally, this system is credited with helping Schwab cut transaction costs, increase gross revenue, open new markets and break down traditional business/IT barriers. "I can't think of anything [other than the online brokerage] that has had more business impact in general," says Lepore.

The customer center hasn't been without its problems—it has suffered some well-publicized outages, including three in one week last October. But in awarding a

Defining VALUE

Charles Schwab's Internet Trading Customer Center sets the standard by which all other online trading businesses are judged. Since its launch in 1996, Schwab's online customer center has grown to serve 2.2 million investors, who use the system to research, execute and manage their securities investments. Internally, the customer center has helped Schwab cut costs, create new business opportunities and carve out a commanding 41 percent of the online investment marketplace.

2000 Enterprise Value Award to Schwab, judges note that the system's flaws are far eclipsed by its impact on e-commerce in general, electronic investing in particular. "I do have a little question about what happens [to customers] when the network goes down," says judge Patricia M. Wallington, retired CIO of Xerox. "But there is no question that [Schwab] has changed the way trading is done."

Birth of a System

No doubt a lot of Schwab staffers had a hand in the delivery of the online customer center, but two of the primary parents were Randy Goldman, vice president of the electronic brokerage, and her colleague Vincent Phillips, senior vice president of electronic brokerage technology. Yet, because of the tight deadline when this project was first conceived, they wanted to give it up for adop-

Anatomy of THE SYSTEM

HARDWARE The entire customer center resides in a Unix environment on IBM AIX servers. The applications communicate via TCP/IP. Session data is maintained through a proprietary middleware layer that resides on RS/6000 machines from IBM.

SOFTWARE The website is built using C/CGI technology, which creates dynamic HTML templates. The source code is maintained with Rational's ClearCase product, and the site makes extensive use of JavaScript.

NETWORK The site is accessible via the internet through Schwab's TCP/IP network at www.schwab.com. The site is frame-based and supports browsers ranging from Netscape 2.0 to Internet Explorer 5.0 and AOL.

tion. Gideon Sasson, president of the electronic brokerage enterprise, asked Phillips to solicit bids from outsource vendors. "But no outsourcer could come near our time frame," says Phillips. "They all wanted \$4 million and close to a year [to complete the project]. We had no choice but to do it in-house."

Not only did they do it in-house, they did it on time and for half the money, roughly \$2.4 million. In part, the project was successful because Schwab historically had made smart IT investments. Under Lepore's leadership since 1993, the company by '96 had automated and integrated its back-end information systems so that people throughout the enterprise were sharing common data and network connectivity. These new systems were essentially internet-ready; they just needed to be capped with a new web interface. And, technically, Schwab was already an online broker with its PC product, StreetSmart, which was introduced in 1994, allowing customers dial-up access to electronic investment services. This product also helped pave the way—and prime the customers—for the new internet venture.

But equally vital was the company's own top-down business/IT integration. Schwab himself is IT-savvy, and company President and co-CEO David Pottruck is an avowed tech junky. These two leaders understand IT's strategic

value, and they have encouraged Lepore to develop a staff whose members are equally at home in the IT and business organizations. Phillips, for example, was assigned from Lepore's corporate IT staff to be a permanent member of the electronic brokerage group. This close business/IT alignment helped Schwab

get up to speed fast with a cross-functional team to brainstorm and build the company's online presence. "The project was typical of Schwab in the sense that it really was a [business/IT] partnership," says Lepore.

By the end of February 1996, the electronic brokerage group had a prototype demo to show Schwab, whose reported reaction was, "Holy cow!" A month later, on March 31, the company went

AN INFORMED INVESTMENT

Gideon Sasson



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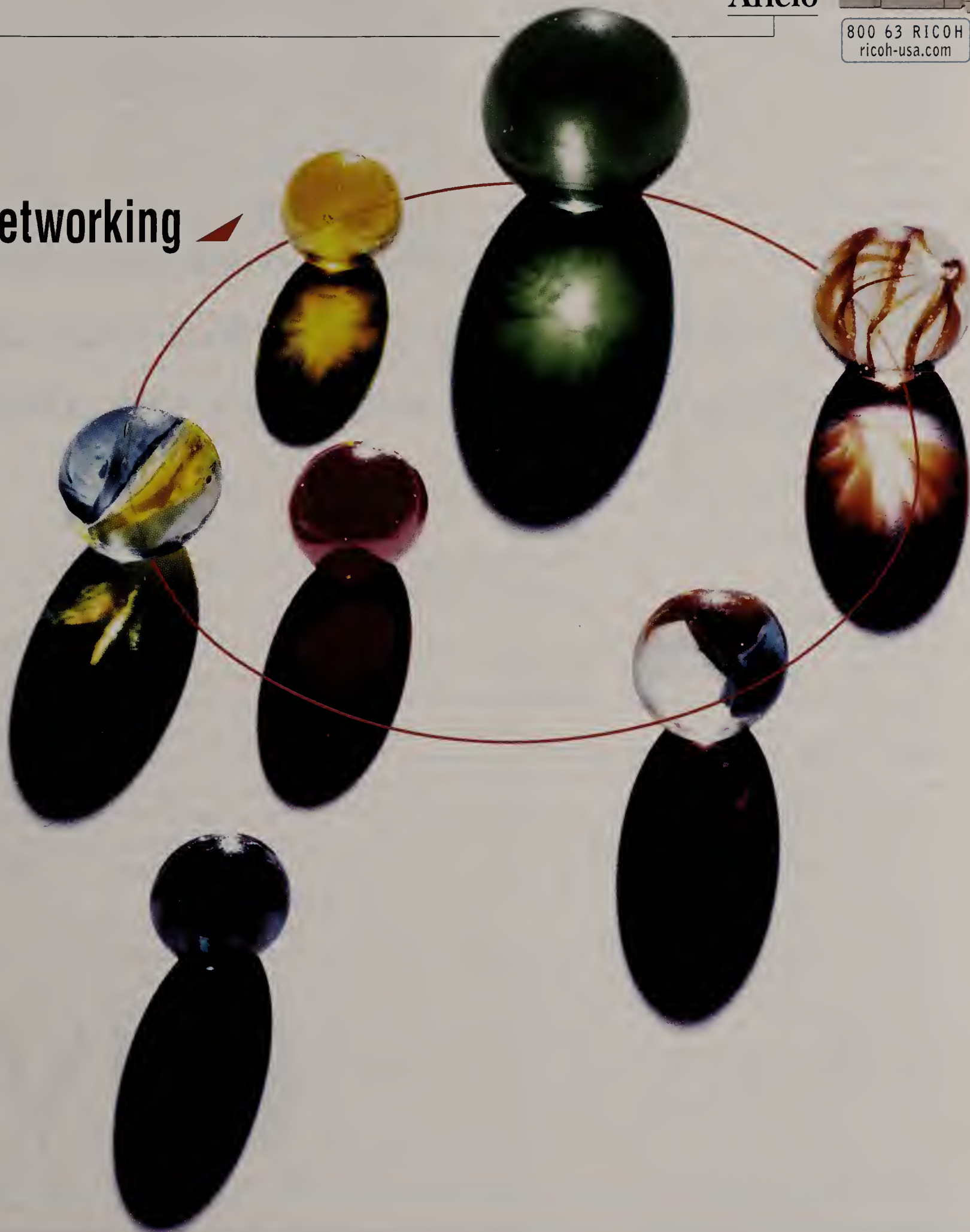
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live with its first version of the Internet Trading Customer Center. Initially, the system had limited functionality; customers could check balances, buy and sell equities and get real-time stock quotes. Period. "We definitely took a phased-in approach," says Goldman. The company didn't even advertise the product when it was launched. "We wanted to work out the bugs," Lepore says. Yet, in its first month, the system by word-of-mouth attracted 100,000 customers. By the end of 1996, Schwab's was the most fully functioning online brokerage in the marketplace. Since then, Schwab has added dozens of new features so that customers today can help themselves to:

Account Information Traders can view their account balances, transaction histories and portfolio performance. Customers also can transfer funds between Schwab and other financial institutions.

Trades Stocks, mutual funds, options, treasuries and corporate bonds can all be traded at the click of a button and then viewed on a comprehensive order-status page that shows when orders are completed, canceled or changed.

Quotes and Research Customers pay for real-time access to stock quotes, charts and news, including the watch list feature, which tracks their own stocks. Schwab's analyst center provides industry news and reports from Schwab's research center as well as from Credit Suisse First Boston and Hambrecht & Quist. A mutual funds center offers information on types of funds, return figures and the top 10 holdings of the funds.

SchwabAlerts This customizable e-mail service informs traders of their account activity, stock performance, securities news and daily market updates.

Planning Tools An asset allocation tool kit helps customers analyze their portfolios, using model portfolios to answer questions about risk tolerance and investment returns.

Other Services Customers can change

their basic account information, update their password and even open new accounts—all functions that previously had to be conducted in a Schwab branch office.

"We've worked extremely hard to develop a customer-friendly system," says Goldman. In the latest [fifth] version of the customer center, no fewer than 500 customers were polled about their preferences. A recently launched retirement planner (see "Planning for Planners," below) is one example of a service added to meet customer needs. Upcoming, Schwab plans to add more research data from market analysts as well as new tools to help customers

benchmark their investments.

The online brokerage marketplace has become increasingly crowded since 1996—Gomez Advisors, which ranks e-commerce companies, currently tracks 50 electronic brokers—and Schwab is hardly the least expensive option. Schwab's electronic commission fees begin at \$29.95, for example, while E-Trade's start at \$14.95. Yet Goldman feels Schwab's system distinguishes itself with its wide variety of customer services. "We provide the most options above trading," Goldman says, "and the reason our breadth of products is greater is because we are the best offline company of all our online competitors."

Planning for Planners

Next-generation web tools help Schwab evolve from investor to adviser

One of the newest features on Schwab's Internet Trading Customer Center is a planner that helps customers track their retirement savings.

Beginning with an investment in one of Schwab's retirement accounts, customers can enter their projected retirement date, estimate how much money they will need for their golden years, then calculate how much to sock away now in savings. With a few clicks, one can also play "what if?" by entering different retirement dates or savings amounts. "This is a starting base for Schwab to begin offering help and advice to customers," says Randy Goldman, vice president of Schwab's electronic brokerage.

Indeed, until recently Schwab's services have been geared mostly toward the informed investor. But now, encouraged by the success of its web tools and the growth of the online trading marketplace, Schwab wants to begin educating and counseling rookie traders. In addition to offering investment tips, Schwab plans to load its customer center with more market research from analysts as well as tools that will help customers judge how well they are doing—and how well they could be doing if they honed their investment strategy.

Schwab's goal is to be the one-stop shop for all online investment needs. So even though competitors might charge less, Schwab's customers derive greater value. "The value for our customers is beyond price," Goldman says. "Our value is a combination of control, access, convenience and the whole democratization of information. Our goal is to provide better value over time."

—T. Field



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Indeed, price has not been a barrier to Schwab's success in the online brokerage ratings. J.D. Power and Associates, in its first-ever review of online traders, ranked Schwab highest for customer satisfaction in 1999. And Gomez, in its most recent (December 1999) review, ranked Schwab

His company today isn't just the largest online brokerage; it's the largest by a lot. Beyond the 41 percent of total assets, Schwab owns 21 percent of the online investing market in terms of total trades, which is at least twice the share of any rival. In the past year

there is cost avoidance; no new call centers have had to be built to handle the additional transaction volume.

The internet also has been Schwab's ticket to enter new global marketplaces. The company maintains only two branch offices in Europe (as op-

Because online transactions cost one-fifth as much as those conducted with Schwab employees, the company has been able to take 80 percent of the costs out of 50 percent of its trades.

first out of 50 internet brokers, ahead of rival E-Trade. "Cost continues to be a factor as the company remains one of the highest priced brokers," Gomez reports,

THE MAN BEHIND THE CALL

Charles Schwab

alone, Schwab has increased its online assets by 96 percent, to \$264 billion.

At the same time that Schwab has boosted revenue, it has cut costs. Online transactions cost one-fifth as much as those conducted with Schwab employees in branch offices or via tele-

posed to more than 200 in the United States), yet via the web, Schwab serves 600,000 European customers—and total European volumes are growing 25 percent a month.

Also, Schwab recently used its basic web template to offer the first Chinese language trading site, and the global expansion continues with new sites tailored for Hong Kong and the Cayman Islands.

Internally, CIO Lepore estimates that 60 percent of all Schwab employees use the customer center for their own investments or to assist customers. Leaders credit the internet with all but erasing the already blurry line between the company's business and IT staffs. "The key is that there aren't any barriers [between business and IT]," says Phillips. "Although I report to Dawn [Lepore], I feel like a part of the electronic brokerage team. Sometimes I refer to the rest of the IT organization as 'the IT organization,' and I have to remind myself, 'hey, I'm a part of IT.'"

"The lines are very blurred between technology and business," Goldman agrees, emphasizing the point by asking Phillips, "I'm sort of IT, aren't I? I'm almost a techie."

"You're a techie," Phillips grins. **CIO**



"but investors should overlook the high commissions to take advantage of the site's features."

Clearly, Chuck made the right call.

phone, so Schwab has been able to take effectively 80 percent of the costs out of 50 percent of its trades—roughly \$439 million in 1999 alone. And then

What is your customer experience with online investing? Tell Senior Editor Tom Field at tfield@cio.com.

e-service [ee'servis] noun.

Electronic customer service that (1) Provides prompt, accurate response to customers requesting information, products or services via Web site or e-mail. (2) Ensures customer satisfaction regardless of peaks in volume, or (3) Proactively sends customers offers and information tailored to their interests. [see Talisma Corporation, others.]

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A simple technology solution makes a world of difference for cancer patients and their doctors at remote Pacific military hospitals

BY ELAINE M. CUMMINGS

Basic Training

First, be very clear of one thing:

This is not just another story about information technology. It's a story about Lucyana Hayes.

Lucyana Hayes is a petite 30-year-old Malaysian woman with a 2-year-old daughter and a husband in the U.S. military. She has big brown eyes, a brilliant white smile, closely

cropped sable hair. And breast cancer. It was discovered just after her daughter, Paula, was born, while Lucyana and her husband, Tim, were stationed on the tiny Pacific island of Guam, thousands of miles from nowhere.

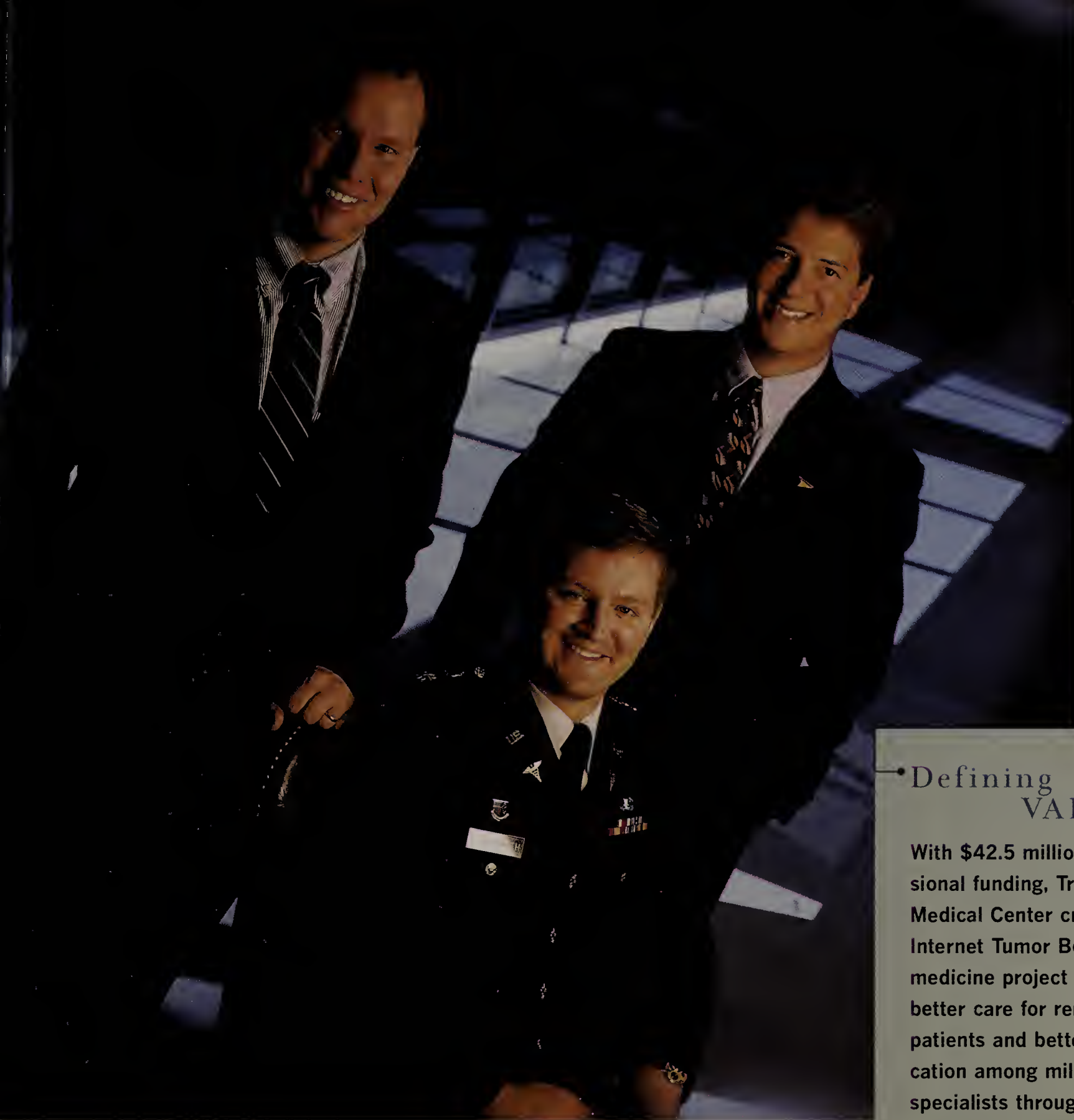
It was a devastating diagnosis, but Lucyana's rough road was eased at least a little because her illness was discovered at a time when her local Army doctor was able to con-

fer, via the internet, with cancer experts at Tripler Army Medical Center in Honolulu, some 3,500 miles away. Working together as they never had before, these physicians were able to agree quickly on a treatment for her that would maximize her quality of life with her family.

Had Lucyana been diagnosed just a year earlier, her treatment would have been very

different. She would have been placed in the hands of a local, young military doctor fresh out of a residency program. Likely a surgeon or internist by training, he would not yet have developed any expertise in cancer specialties such as radiology or oncology. And unaware of any other options, he probably would have performed a radical mastectomy and then "mailed" his patient via a seven-hour air evacuation flight to Tripler or a larger stateside hospital to receive more specialized care.

Once there, Lucyana—uprooted from family and friends, scared and confused—would have had to start from scratch, be retested, rediagnosed and reevaluated by new doctors



CHAIRMEN OF THE BOARD (left to right) Dr. Bruce Cairns, Dr. Brian Goldsmith and Robert Whitton

who would create a new treatment plan. The good news, of course, is that the arduous trip would have given Lucyana access to more advanced care. The bad news is that her treatment would have meant traveling far away from her home and family, spending many months puzzling through complicated cancer care with new doctors. It wasn't that the system was designed to be deliberately cruel; it's just that no one had thought of a better way to treat such patients.

No one, that is, until Dr. Brian Goldsmith

arrived at Tripler in 1993. A radiation oncologist on active duty in the U.S. Army, Goldsmith is the mastermind behind the Internet Tumor Board—a web-based telemedicine system that allows medical specialists to coordinate cancer care by sharing diagnoses, lab reports and X-rays via the internet. Simply put, the system is a lifeline for doctors and cancer patients stationed at remote military outposts in Guam, Seoul or Okinawa.

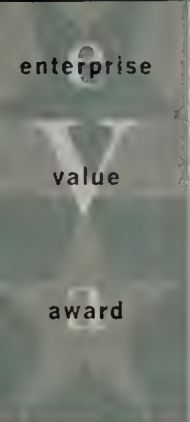
Funded initially as a research project, the Internet Tumor Board has now become standard operating procedure, according to Commanding General Nancy R. Adams, Tripler's CEO. Effective this fiscal year, she

Defining VALUE

With \$42.5 million in congressional funding, Tripler Army Medical Center created the Internet Tumor Board, a telemedicine project that led to better care for remote cancer patients and better communication among military medical specialists throughout the Pacific islands.

has agreed to continue the funding needed to keep the Internet Tumor Board operational.

Probably not surprising, the return on investment for the project wasn't positive in terms of dollars. In three years, \$1.8 million was invested in simple technologies, resulting in what Lt. Col. Rosemary Nelson, program manager and CIO of the Pacific Regional Program Office, estimates as about \$800,000 in reduced costs for unnecessary medevacs, surgeries and patient visits. Yet the Internet Tumor Board's value goes beyond simple ROI, earning the support of such prominent proponents as Hawaii Sen. Daniel



Inouye. "I've supported this program because it successfully utilizes low-cost, high-tech resources to improve health-care services," Inouye says. "Although we have no foolproof way of quantifying the program's returns and benefits, I am certain that it has saved lives."

One sure sign of the project's lasting value is its endurance despite the turnover of military doctors who are reassigned to new locations every one to three years. "The concept of the Internet Tumor Board has survived even after its champions have moved on," says Patricia M. Wallington, retired CIO of Xerox and one of the judges of this year's Enterprise Value Awards. "Newcomers continue to be willing to participate, and that's what makes this such a great public-health service."

For Goldsmith, the Internet Tumor Board seemed the least Tripler could do for patients. For Lucyana Hayes, it meant the difference between simply treating her cancer and treating *her*.

A System Comes to Life

Located just eight miles from Waikiki Beach, Tripler Army Medical Center is the largest military medical treatment center in all the Pacific—serving the

Army, Navy, Air Force, Marines and Coast Guard—and it is the only Army medical center not located on the U.S. mainland. The Pink Lady, as Tripler is affectionately called by Hawaiian locals, sits high atop the Moanalua Ridge, a part of the Koolau Range overlooking Pearl Harbor. Its sprawling stucco facade was painted a rosy hue to blend with the red dirt from its surrounding hillside, but, nonetheless, it still stands out in a Pepto-Bismol sort of way.

The role of the 338-bed hospital is as unique as its geographic location: Military readiness is job one. Strategically located in the Pacific to provide care to forward-deployed forces in times of war, Tripler played a pivotal role in the life-saving care given to hundreds of military and civilian casualties from hostile fire by Japanese war planes on Dec. 7, 1941. Today, Tripler supports a referral population that includes Guam, Kwajalein, Eniwetok, Johnston Atoll, various U.S. Associated Pacific Islands, Japan and Korea—an area that encompasses 3 million square miles of ocean and 700,000 square miles of land mass. In all, more than 850,000 individuals—active-duty personnel, retirees, veterans and their families—are eligible for care at the Honolulu hospital, which also serves as a major medical teaching facility.

When Goldsmith arrived at Tripler, he was just one of a team of doctors who would meet weekly with a traditional tumor board—a practice known to most large hospitals as a means of coordinating the many facets of treating cancer, which, unlike other medical problems, usually requires the input from various specialists. On a tumor board, medical oncologists, radiation and surgical oncologists, pathologists, radiologists and social workers each contribute expertise to

coordinate the multidisciplinary care necessary for integrated cancer treatment.

At Tripler, traditional tumor boards made sense for local cancer patients who came directly to the hospital. But treating patients from the outlying islands in the Western Pacific—patients like Lucyana Hayes—was more of a challenge to Tripler's doctors. "Too often patients would be referred to Tripler after their initial diagnosis and surgery, and arrive at Tripler unclear about their treatment and their duration of stay," says Goldsmith. "That confusion would intensify their anxiety and often translated into a delay in getting their treatment started."

In addition, Tripler's physicians had little connection with the remote doctors, and, as a result, communication between the two factions was greatly impaired. "They didn't know how to get a hold of us to tell us a patient was on the way," says Goldsmith, "and we didn't know how to get much follow-up from them once the patient returned home."

But what if Goldsmith could find a way to include the remote doctors in Tripler's tumor board sessions each week? What if all these specialists could use the internet to bridge their geographic and communications gaps? Wouldn't the patients' treatment be more effective and better coordinated? These are the questions that led to the rise of the Internet Tumor Board. The goal was not to save the lives of patients, necessarily—no one could guarantee that—but to help them get to Tripler in record time with a treatment plan in place. The patients would know their new doctors, and their doctors would know them.

Remote doctors in Guam or Seoul or Okinawa suddenly would have access to cancer experts at the large teaching hospital in Hawaii.

"Brian's idea was beautiful in its simplicity," says Nelson, who is also the head of the department that facilitated the technical expertise the doctors

Anatomy of THE SYSTEM

HARDWARE A MedWeb server and Lumisys film digitizers capture and store X-rays. A pathology microscope with a digital camera records pathology slides. Board meetings are conducted via multimedia desktop computers while an InFocus projector displays images.

SOFTWARE Meetings are run using NetMeeting (freeware) desktop conferencing software from Microsoft.

NETWORK Connectivity is provided over the internet.



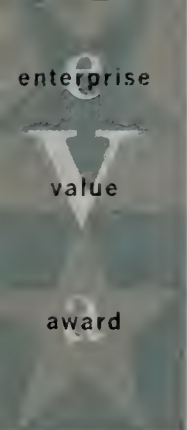
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needed to realize Goldsmith's vision. "And to make it work, the technology would have to be simple as well."

Tripler's reputation for medical care was superb, but when it came to IT, its capabilities were hardly state of the art. Doctors had basic internet connections. They knew how to use conference phones. And they dabbled in some digital photography. Still, Goldsmith says, "I figured we had enough with all that to support the notion of an intra-hospital tumor board."

So in 1995, with the help of Tripler's technology experts and then Col. Laurie Davis, Goldsmith applied for funding available through the U.S. Army Breast Cancer Research Program. Goldsmith wrote a proposal asking for \$900,000 for fiscal year '96 to fund the Internet

made sense to teleconference the audio portion of the weekly meeting via speaker phone. "By doing so, we also addressed the security issues," says Whitton. "We didn't use anything that would identify the patient on the web; instead sharing personal information only over the phone lines."

In October 1996, Tripler's doctors were ready to test the premise and reap the rewards. But they soon were surprised at how the project would affect business-as-usual. "Physicians began to prepare differently for the Internet Tumor Board than for their regular tumor boards," says Goldsmith. Veteran doctors now had a chance to emerge from the ivory tower and teach their less experienced colleagues in faraway lands. And because the specialists could get informa-

were, well, less than Cairns had come to expect back in the States. "Because patients there didn't have high expectations about their medical care, you could get away with less," he says, "but you couldn't go to sleep at night thinking like that."

Without a tumor board of their own, remote doctors were hungry to communicate with Tripler's experts. "But we didn't know them, and we didn't know how to get a hold of them," says Cairns. "Phones there would just ring and ring." It meant a lot that the doctors at Tripler were willing to reach out to their colleagues in the Pacific. "It also meant a lot to the patients," Cairns says.

It was against that backdrop that the first Internet Tumor Board was conducted with Cairns in Guam and the

"Although we have no foolproof way of quantifying the program's returns and benefits, I am certain that it has saved lives."

-Hawaii Sen. Daniel Inouye

Tumor Board project. It was to provide a basic telecommunications infrastructure and install teleradiology equipment at six different Pacific medical sites: Tripler, Guam, Seoul, Korea, Okinawa, Yokota and Yokosuka. "We didn't have to establish any connectivity because the Department of Defense had already done that," says Davis, but the funding was necessary to install minimal equipment and train physicians at each of the pilot sites.

"And then we did a little evangelism to get people excited about the idea," Goldsmith says. It was important that the technology staff not try to change the way the doctors already practiced medicine—physicians didn't want to fiddle with the Tumor Board concept; they simply wanted to find a way to make it work long distance.

Because of a lack of bandwidth, Project Manager Robert Whitton says it

tion about each case in advance and at their leisure, Goldsmith says, they could think more about their recommendations before they met. "When they showed up at the first Internet Tumor Board," he says, "they hit the ground running."

A System Changes Lives

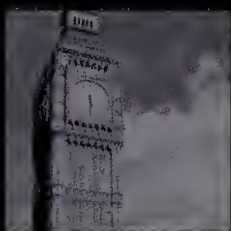
If Goldsmith was the great communicator of the Internet Tumor Board, then Dr. Bruce Cairns was its loudest voice. "Hardly," he says, modestly. "I was simply a believer." Cairns had just finished his residency and was a general surgeon stationed in Guam in 1996 when he met Goldsmith, who was out preaching his vision of the Internet Tumor Board. "Others may have felt skeptical at first—they saw it as another project whose funding might dry up," says Cairns. "But when Brian told me about the project, I couldn't wait to get involved."

It seems medical resources on Guam

team of experts, including Goldsmith, in Honolulu. Says Cairns, "I presented my patient's case, and they presented their recommendations for her care, including the coordination of her trip to Honolulu and the follow-up treatment when she returned."

The Internet Tumor Board provided a new kind of link between the referring physicians and the specialists. "Before, we had a funny disconnect," says Cairns. "The referring docs thought that once we sent a patient to Tripler, no one would talk to us, and we wouldn't find out what happened until our patients came back home. And for the specialists, once they sent that patient back home, often times they were left wondering how [the patients] were doing," he says.

Suddenly, everyone was talking on a regular basis, the way they might if they had all been under the same roof. "We agreed early on that we had to be col-



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LIFE SAVERS Lt. Col. Rosemary Nelson (left) and Gen. Nancy Adams

leagues,” says Cairns. “We weren’t going to spend a lot of time working on something like this to be treated like garbage,” he says. “We needed to trust them, and they understood that.”

They also understood that trust cuts both ways. “New doctors have a lot of confidence issues,” says Cairns. “They needed to trust us to take care of the patients locally as much as possible. That alone made an impact when we were trying to make life-and-death decisions.”

One of the project’s greatest benefits was that remote doctors were able to gain enough expertise to treat some patients locally. In fact, eight out of 26 patients presented in the first year alone were able to receive all their treatment in their community hospital setting. “We were spending thousands of dollars sending patients

back and forth to Hawaii,” says Cairns. “Suddenly, we had the ability to treat some patients without the added expense and confusion of sending them thousands of miles away for care.”

And then, if patients needed to go to Tripler, the new-found colleagues on the remote islands could send along the right kinds of information so that key tests would not have to be repeated. “It had an amazing effect on everyone,” Cairns says.

Just as significant were some unexpected benefits that came from the newly created connection.

Continuity. Doctors learned to create better, seamless care for patients referred to Tripler. Thanks to the efforts of people such as Joan Foley, a registered nurse who served as a case manager to eliminate any potential for discontinuity, a treatment plan was in place before patients ever left their small islands. This continuity was particularly

important since military doctors are frequently transferred.

Shared expertise. The Internet Tumor Board also gave birth to the Internet Grand Rounds, where every month, one of the hemisphere’s experts would present a lecture on a particular medical subject, and the doctors involved could participate in a Q&A session afterward using the internet for multimedia presentations.

Continuing education. Participating physicians earn one hour of Continuing Medical Education (CME) credit for every hour they participate in the Internet Tumor Board’s weekly lectures and discussions. Because physicians need CMEs to maintain their credentials, the Internet Tumor Board became a great alternative to the burden of traveling stateside for educational conferences.

New rules. Participants also learned some simple rules about telemedicine that have been transferred to Tripler’s expanding telehealth efforts in military installations in Alaska and with the University of Hawaii Medical School.

Still, Cairns and others didn’t need outcome data or statistics or a positive return to understand the Internet Tumor Board’s value. “It was obvious,” he says. “I’ll never forget the first day I met Lucyana,” Cairns remembers. “When you’re 28 years old and pregnant, and you have a cancer diagnosis, you’re terrified. I decided there was no way we *weren’t* going to find out immediately how to help her.

“You can’t put a price tag on what a project of this sort means to people like Lucyana,” Cairns says. “We sometimes overlook the impact. Until it’s you. Or someone in your family. Then a project like the Internet Tumor Board becomes priceless.” **CIO**

Do you have a technology project that made a difference? If so, Senior Editor Elaine M. Cummings wants to know. She can be reached via e-mail at cummings@cio.com.

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A manufacturing process makeover helped Dell change its production line enough to climb to the top in U.S. PC sales

BY STEWART DECK

Fine Line

The world changed for Dell in April 1997.

Sure, Dell had been a very successful computer system maker before that. Its direct sales model was successful enough up to that point to have helped it inch ahead of rival IBM into third place in U.S. PC sales behind Packard Bell NEC and juggernaut leader Compaq.

Dell had also just counted profits of \$518 million for its most recent fiscal year and its forecasts were absolutely rosy.

And yet, third place just didn't have a very satisfying ring to it.

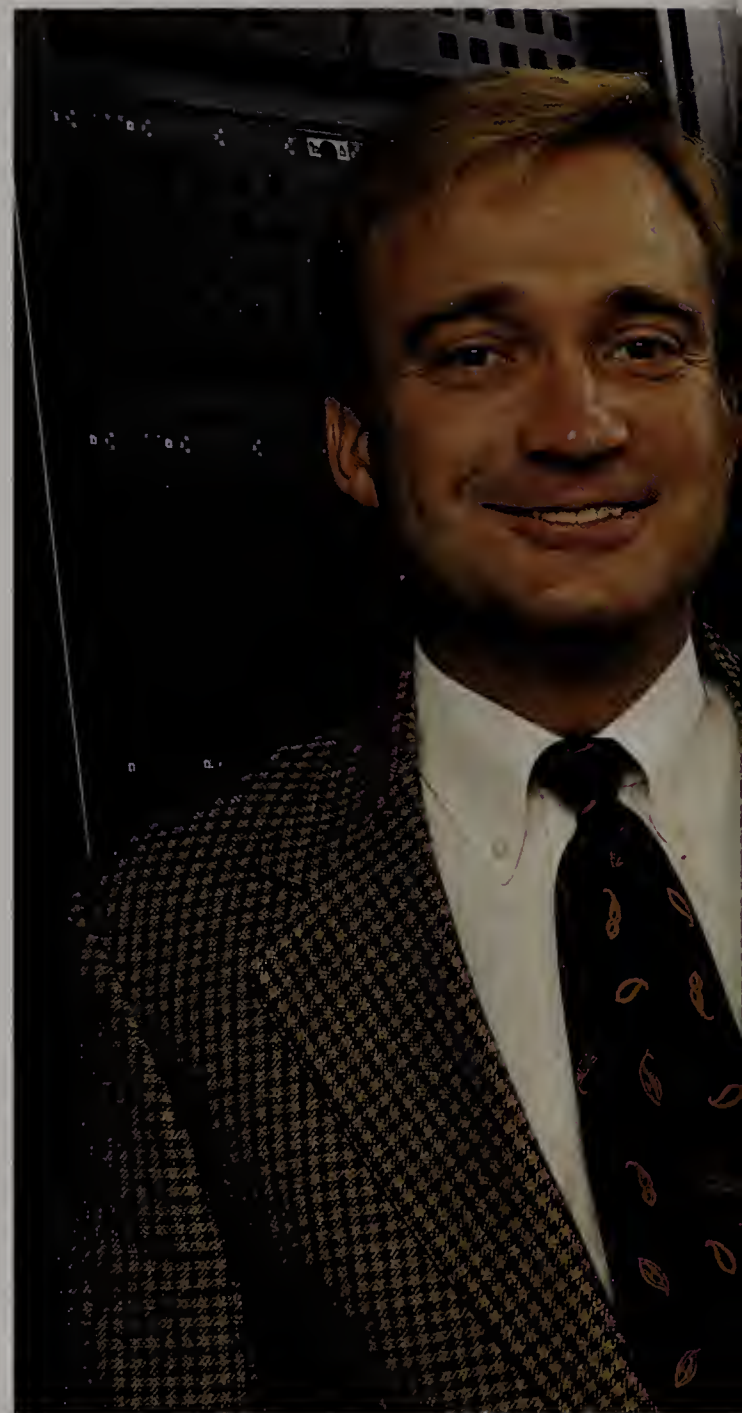
So, after pouring over projected forecasts and holding many high-level strategic planning discussions, Dell decided to change the way it made PCs.

"Our projections showed a dramatic

increase in demand," says Terry Kelley, vice president of Worldwide Operations I/T at Dell. "We could have tried to build more factories to keep up, but it would have been very expensive and difficult to do. We decided instead to make some fundamental changes in how we built the machines."

If Dell had been in the restaurant business, this would have been the point where it discovered that its kitchen functioned well

enough for its current size, but new recipes and smashing reviews were starting to bring in crowds. Dell decided that what it needed would have been the equivalent of either building a huge new kitchen—maybe even a whole new restaurant—and adding lots of staff or expanding more efficiently by creating a new kind of kitchen that featured a new way to think about constructing delectable dishes and getting them to the ever-increas-



ing number of patrons in a timely manner.

Prior to April 1997, Dell had in place a fairly standard assembly-line process for making servers and PCs. Computer chases

PROCESS CHAMPS Terry Kelley (left) and Everett Lamb

What Brown, Kelley and the IS team came up with was a plan for Metric 12: a new plant designed by combining just-in-time manufacturing—the concept of avoiding the need to warehouse inventory by having only what you need when you need it—with the already-famous customized Dell

small teams would now build the complete machines following precise order guidelines and using the components in the carefully indicated racks in front of them.

The planning teams went to work figuring out how to organize the space inside the new plant. In the process of designing and redesigning plans, they had to define their new manufacturing processes and then learn what was required to support them. Once the concept and design plans were final in December 1996, the earth movers started rolling. Metric 12 was completed the following April in four breathtaking months due to a combination of hard work and simplicity of the final designs.

Was it imperative that they build the plant quickly? The answer from Dell executives is a resounding yes, partly because they had to meet the public's demand for more and more new systems and partly because they realized just what an advantage their new processes would give them over their competitors.

"When you're trying to complete a project like this in a very short time you can do it one of two ways," says Gregor Bailar, one of the Enterprise Value Award judges and vice president and CIO of the National Association of Securities Dealers (NASD, the parent organization of Nasdaq). "You can build a quick-and-dirty kluge of existing sys-



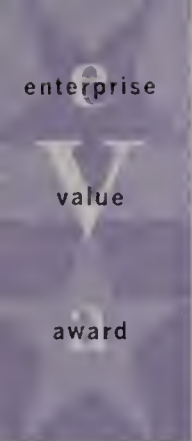
would roll down with one person after another adding on a bolt here, a processor there. In this progressive-build system, it took up to 25 people to build one machine. That had to change.

"Our goals were to reduce the number of worker touches per machine to reduce time and costs," says Larry Brown, one of Dell's visionaries as vice president of Worldwide Process Technology and Quality.

approach. The plan called for giving assembly line workers more responsibilities and components so that each one could build more of a machine by themselves. Because fewer people were going to touch each machine, building errors could be cut exponentially. That gave the line workers a greater sense of involvement and ownership of their work. Instead of simply adding a bolt here and a chip there, workers in very

• Defining VALUE

Dell's Metric 12 factory in Austin, Texas, is where the PC maker first implemented a new method to build computers using just-in-time inventory delivery and a brainy integrated system of racks, rollers and supply databases. The entire \$1.6 million IT operation increased assembly line throughput, dramatically decreased in-line downtime and helped reduce employee turnover.



tems, or you can build a real process of technology management," he says. Dell chose the second, "and that's what impressed the judges," says Bailar.

Dell's teams designed a method for quickly moving component parts into the plant. And they had to move the completed machines out as fast as they were finished. To do that, they had to find a way for the manufacturing teams to know they had all they needed to finish an order—whether it was for a single PC or for 200 of them—before they started building the first one.

"First, we had to learn what it meant to know that you could finish an order before you start it," says Brown. "Then we had to create an inventory control system and a workflow system," he says.

Everett Lamb, now a senior manager of plant technology business analysis, was on the team that designed the Metric 12 technology systems. "We realized that, if we could break large stocks of inventory into stockroom racks, it would increase our accuracy and our speed."

To see what that meant, let's go back to the restaurant notion.

Imagine that a party of six comes in to the old restaurant, and they all order the grilled ginger salmon special with sugar snap peas. Before you start the order, you want to make sure you have enough salmon and snap peas to finish all of them at the same time so that you're not serving each person in the party at a different time. If your kitchen is busy, you don't have the time to go out shopping for more salmon at the last minute. And if you leave your hungry customers waiting too long, they'll go elsewhere to eat.

Now imagine that you have a system in place that ensures you have all the ingredients you need in front of you before you start—one that almost hands you the ingredients you need. Your order accuracy goes way up and things move significantly faster.

What Dell did was very close to that, except the menu was huge and the num-



ber of ingredients even larger still. For example, each machine could have any of a dozen or so microprocessors and any of two dozen network adapters. When you figure in memory, disk drives, video cards, storage devices, sound cards and even monitors, the number of combinations quickly skyrockets—and that's not even figuring the types of software that Dell can install on each system.

To handle those possible combinations, Dell put in place a system of baskets, racks and traffic signals it called the Pick-To-Light system. Made by Kingway Material Handling Co. in Acworth, Ga., the Pick-To-Light system is based on an up-to-the-minute database that runs on an SCO Unix operating system platform and is tied to a stockroom system. By

FINISHING WHAT HE BEGAN

Founder Michael Dell

tying it to work-in-progress stockrooms, the order-level material checking system keeps track of which materials need replenishing and makes sure the racks are filled with the proper components.

In planning the system, Kelley and his team realized they needed to rework two key pieces of the manufacturing process they had planned: how component materials came in and where in the system decisions were made. "We get too many things from too many suppliers," says Kelley, "so we consolidated our supply chain, reducing the number of suppliers we used. And because speed was so important, we decoupled the



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decision-making process from the events in the factory. You can't be waiting on IT systems in a manufacturing operation."

By consolidating its number of suppliers, Dell was able to keep component supplies moving into the plant smoothly without any bottlenecks backing up at the incoming supply loading dock. The PC maker also encouraged suppliers to locate their facilities nearby so that Dell's component orders could be filled quickly.

"What Dell has done is not trivial to execute by any stretch of the imagination," says John Glaser, one of the Enterprise Value Award judges and vice president and CIO of Partners Health-Care System Inc. in Boston. "It takes a lot of ability to execute such a massive change in a continuous flow operation."

Implementation Success

Starting that May, Dell's world was different. After undergoing this change and implementing these systems in the Metric 12 plant in Austin, Dell started carrying this approach to all of its manufacturing centers. Plants that have opened in the last 12 months in Brazil and Nashville, Tenn., are modeled closely on the Metric 12 facility.

"After the Metric 12 installation, we got the [implementation and planning] teams together, compared notes and came up with a full documentation plan that we have used as a blueprint in other installations," explains Victor Koncaba, a senior manager of plant technologies applications development at Dell. That replicability impressed the Enterprise Value Award judges.

"Dell has shown that it can reproduce this model in other new manufacturing plants," says NASD's Bailar. "They had technology management under control and therefore gained a breakaway strategic advantage from doing so," he says.

Patricia M. Wallington, another of the judges and former CIO of Xerox, says that not only did Dell make this manufacturing makeover work, "but it has

flourished because of it and will build on it in the future." It was "truly a visionary, clean-sheet process that others will strive to imitate," she says.

Dell also achieved what it really set out to do. It has increased its manufacturing speed and throughput by 150 percent and raised the uptime of its manufacturing lines by more than 95 percent. Dell officials also say that reducing the repetitiveness of assembly line jobs reduced employee turnover. That occurred because line workers now have more skills and less boring repetition in their daily work; within their small workgroups, they can build and complete machines themselves. That gives the line workers a much greater sense of personal accomplishment, which keeps them happier with their jobs and results in decreased worker turnover. All with an IT investment of just over \$1.6 million.

"When we began I said I had one sim-

ple request," says Brown. "I wanted my folks to not be fearful of starting an order."

That simple request led to Dell now cranking out 1 million machines from Metric 12 every three months and brought along some encouraging financial results too: Dell cleared \$1.5 billion in profits last year.

And remember back in 1997 how unsatisfying third place was? Well, that has changed too. In the third quarter of 1999, Dell climbed past Compaq to be the top seller of PCs in the United States.

Terry Kelley can state very clearly what impact the design and building of Metric 12 had on the company. "The most important part about this project is that it made us number one." **CIO**

What are your thoughts on Dell's just-in-time manufacturing process? Share your comments with Stewart Deck at sdeck@cio.com.

Anatomy of THE SYSTEM

HARDWARE Dell's Metric 12 plant is run by 46 Dell servers of various shapes and sizes. Twenty of those servers run the Pick-To-Light system of racks, baskets, lights and conveyers and 20 other servers function to burn in the software on each machine as it finishes its journey down the assembly line. The plant is wired with 134 miles of fiber-optic cable and 1,300 miles of Category 5 cable. A Tandem mainframe helps oversee the whole operation's logistics.

SOFTWARE The software for the Pick-To-Light system is proprietary, built by Kingway Material Handling Co. It communicates with Oracle and Windows NT-based shop-floor control and materials systems. Business analysis is carried out using Crystal Reports and Brio business intelligence tools against real-time Oracle operational databases.

NETWORK The plant operates on an ethernet network with 4,200 switched network ports. It is connected to the main Dell campus in Round Rock, Texas, through a 90-megabit metropolitan area network.

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BY MINDY BLODGETT

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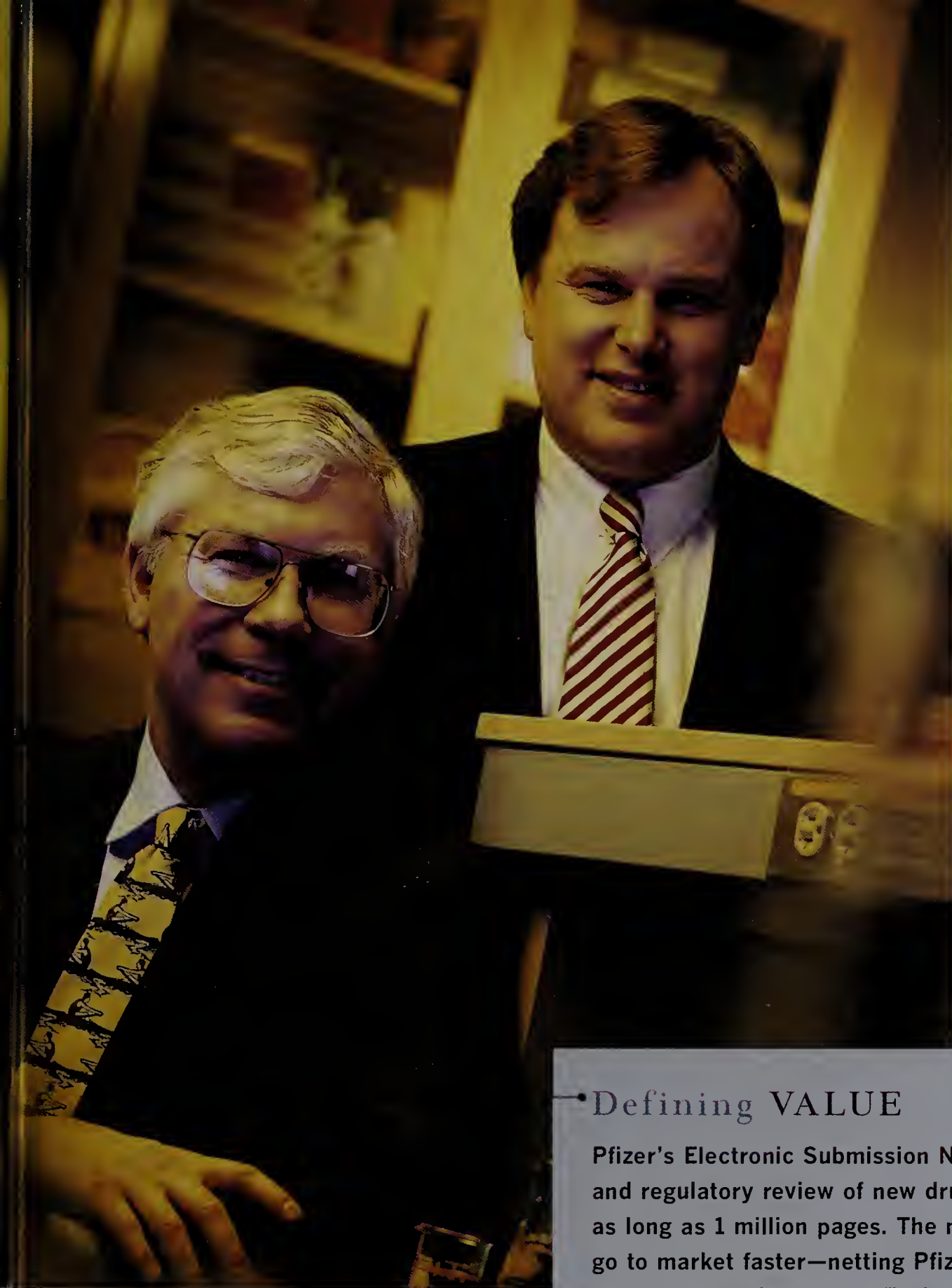
Drug companies must conduct broad, expensive trials before their products ever get to the Food and Drug Administration (FDA) for approval. Out of the tens of thousands of compounds that are discovered each year, only 7 percent of them make it into your medicine cabinet. After an extensive development phase, pharmaceutical companies must back up their claims for a drug's efficacy for

the safety of the public by submitting mountains of paper to the FDA—the federal agency set up to evaluate pharmaceutical products before going to market. The FDA's approval process is also a long and detailed one. In many cases, the documentation that companies must provide to the FDA can grow to a ponderous number of pages—typically 1 million.

In addition to the elaborate development and approval process, drug companies are also facing added pressures from a Congressionally-mandated restructuring of the FDA's review process. The mandate requires that the FDA shorten its review process to just 12 months from its typical 18 to 24 months in order to get drugs to market faster without compromising safety.

So in an effort to move documentation more swiftly through the FDA's approval process, Pfizer has switched to an electronic-based drug submission process. The giant pharmaceutical company's Esub—Electronic Submission Navigator—offers

PHOTOGRAPHY BY TRACEY KROLL



MEDICINE MEN Scott Hopkins (left) and Walter Hauck

a vast departure from its old paper-centric way of submitting documentation to the FDA.

Pfizer's award-winning system has delivered impressive results. It cost \$3.2 million to develop and has so far netted the company at least \$142 million in revenues due to shorter cycle times. But it has also given the company much more than bottom-line benefits: Esub has changed the way the research clinicians and the IT staff work together.

Defining VALUE

Pfizer's Electronic Submission Navigator (Esub) speeds internal and regulatory review of new drug applications, which can run as long as 1 million pages. The new process means that drugs go to market faster—netting Pfizer more than \$142 million in revenues over four years. Esub has also become an internal knowledge sharing and data tracking tool.

"Esub has had enormous impact in that it has transformed the way we do things internally," says Dr. George Milne, president of research and development for Pfizer's Central Research Division in Groton, Conn. "Our ability to execute new drug filings has been brought to an unprecedented scale," he says. "It's much more than just an interesting computer system. The tools that Esub gives us will stimulate insight. We expect it to lead to a cascading effect of innovation," he adds.

"Pfizer's results directly affected its industry and served as a role model and a benchmark," says Gregor Bailar, vice president and CIO at the National Association of Securities Dealers and an Enterprise Value Award judge.

Mired in Paper

In mid-1995, Pfizer's researchers were working on the development of Trovan, a new antibiotic drug that was being readied for FDA approval. The potential new product would be the largest anti-infective submission ever received by the FDA.

Typically, researchers and support staff would have produced separate sections of a paper document to report test results of drug trials. Each section would eventually be assembled into a master document, called an NDA—a new drug application—that could amount to as many as a million pages, or the equivalent of a tractor trailer full of paper. Once compiled, the NDA was edited, copied and sent to the FDA to start the approval process.

The FDA would take the report apart, send portions of it to appropriate reviewers, who, in turn, would write their own analysis. Needless to say, document management, revision control and cross-reference accuracy were a challenge for the agency. Working with 20,000-page sections, individual reviewers had to slog through a stack of papers often 5 or 6 feet deep. They would leave questions on sticky notes and send runners back and forth from a large warehouse where the master document was

P F I Z E R I N C.

stored. It might take several days or even weeks for a question about a new drug's potential uses or side effects to reach the appropriate source. "If the reviewer found something in volume 99 on page 20,592 that referenced something on page 9,000, for instance, they'd have to send a request to the FDA library and wait for a copy," says Walter Hauck, then an associate director in charge of clinical application

ing about trying to find a way to build an electronic version of the NDA right from the start. "Everyone wanted nirvana, but no one knew how to get it," says Hauck, who had only recently come to Pfizer. "Back then, there were no good search engines, and the technology just wouldn't support an electronic solution," he says.

But the web was beginning to take off, and Hauck suggested that it might

van," says Hauck. "We guessed that it would be 200,500, maybe even 1,000 documents—somewhere in the range of 50MB," he recalls. But the Trovan submission grew to almost 50,000 documents, "close to 180GB," he says. "It was the biggest thing I'd ever seen!"

Yet as the project grew, enthusiasm for it also grew. "The IT team would work for three hard days building a prototype. Then we'd deliver it to the clinical team and say, 'What do you think?'" Hauck says. "They'd use it, give us feedback on what they liked, what didn't work at all. And we'd go back and build a new prototype."

At one point, the clinical team members became concerned that electronic files would not faithfully reproduce scientific symbols. So they hired 30 summer interns to painstakingly check through 20,000 documents to ensure that those files were accurate. If that weren't enough, about a month before the Trovan drug submission was due and Esub was expected to debut, the team discovered that one of the regulatory reviewers would be conducting his review out of his Rhode Island home via his own PC. So the IT team had to completely configure another server, including building the content, the feeder system and the business rules, at a cost of \$200,000.

After working together for so long, the team members became close. "We had worked our hearts out, and sometimes I wanted to cry," Hauck says. "We ate up several people and caused a lot of divorces with our 100-hour workweeks," he says. "But we had a talented IT staff and a committed clinical team who began to believe this technology was magic."

On Dec. 28, 1996, nine months after its conception, Esub was delivered to its two proud parents. Pfizer's clinical and IT teams shared ownership of the risks as well as the rewards. "Without the IT and business collaboration, Esub would



DOCTORS' ORDERS Dr. James Milson (left) and Dr. George Miine

development and now director of clinical systems. "The reviewers needed more than the latest version of a specific section of the document," he says. "They needed the latest version of every section of the document."

To solve the problem, Pfizer's staff used Computer Aided NDAs (CAN-DAs) to build sections of the document electronically. But they didn't provide all the data, and performance was slow. "It was simply the best we could do with the technology at the time," says Hauck.

In 1995, everyone at Pfizer was talk-

ing about trying to find a way to build an electronic version of the NDA right from the start. "I was the new guy, so I didn't know that we couldn't do it."

Hauck and his IT team showed a crude prototype in April 1996 to one of the Trovan clinicians, who in turn showed it to Scott Hopkins, executive director of anti-infectives. Hopkins instantly saw the benefit of the project and gave it the go-ahead.

Pfizer's IT team created about one Esub prototype per week, rewriting the code nearly 40 times until it got easier to manage. Yet, not surprisingly, Esub's development suffered some fits and starts. "Everyone grossly underestimated the size of the NDA for Tro-



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have gone nowhere,” says Hauck. “We all worked together to put an incredible amount of information on the web, and we made it searchable in under a second,” he says. “And all it takes is the push of a button.”

Esub Emerges

In hindsight, everyone at Pfizer was happy that Trovan was the project’s firstborn. “It was so big,” says Dr. James Milson, vice president of information management at Pfizer. “We got to solve the tough problem upfront. Then, when we rolled out Viagra in March 1997”—a much smaller project because Viagra had only one indicated use—“we didn’t need to worry about scale.”

Since its approval Dec. 27, 1996, Trovan has run into several roadblocks. In early 1999, several patients who had taken the drug showed signs of liver problems, and consequently the FDA placed tight restrictions on its use. Esub,

tool away,” says Hauck. “It’s only software, you know, a couple of lines of Perl. It’s the content that’s important,” he adds. “Our competitive advantage is that we know how to build quality dossiers in real-time.”

Esub has also unwittingly created a heightened role for IT within the Pfizer organization. “We now sit right at the business table and no longer just react,” says Hauck. By working collaboratively with its business partners, Pfizer’s IT team constructed a system that

Provides a global view of the status of a trial or application process

Enhances Pfizer’s competitive advantage by linking drug researchers around the world; its Esub system has attracted business partners, including other drug manufacturers that seek to forge strategic alliances with Pfizer to help market and distribute their drugs

Enables Pfizer to penetrate world markets much more quickly by filing con-

featured system—a boon to the FDA, which frequently uses outside consultants to speed the regulatory process

Hauck says that getting the business users—many of whom are medical doctors—to sign on with the Esub effort was easy. “Doctors are competitive,” Hauck says. “So we’d say, ‘So-and-so on the Trovan trial team is really benefiting from Esub,’ and the next thing you know, another business unit would want to be involved.” The number of users of the system has grown to 2,000 worldwide at both Pfizer and at regulatory agencies. In addition, the Esub repository has grown to 5 terabytes, with roughly 1 terabyte of new data added each quarter.

Esub has elevated IT’s role within Pfizer and helped the department align more closely with the business side. Now the IT department is regarded as a close partner in building drugs for the market. “We don’t have a centralized culture,”

says Milson. “But when it comes to Esub, we are working together. We get the data we need far more quickly and easily, and we’re building partnerships that are important for innovation.”

The real value of this system comes in some intangible ways, says Hauck. “This was not a static project,” he says. “It helps us, and it helps the regulators make sure that the work we do is as safe and effective as possible. It makes us very proud. And

it greatly enhances the role of IT in all we do,” he says. “It really has no end. It just has endless possibilities.” **CIO**

Anatomy of THE SYSTEM

HARDWARE Small servers, such as dual-processor Sun Microsystems workstations, maintain content. Client workstations need only an HTTP browser and a PDF reader to view submissions. Data is analyzed using applications such as SAS, either on the desktop or via an X-windows server.

SOFTWARE Content is stored in the file system using Revision Control Software. The Electronic Submission Navigator software is written in Perl. The Esub software is supported by several Solaris administration utilities and tools and is written in C using the Adobe PDF software development toolkit.

NETWORK Esub’s web-based interface allows for mobile review via laptops. Content is indexed for searching using a wide area information search engine. With a combination of caching and cookies, the table of contents can be redrawn within 0.5 seconds, even over low-speed connections.

however, has not suffered the same fate, and its benefits go way beyond a typical return on investment.

Esub has become a companywide data-sharing system that is also being considered by the FDA as a benchmark for other drug companies’ submissions. “It doesn’t hurt our competitive advantage to give the

current submissions in different countries **Gives** the company the ability to deliver five new drugs every 12 months, an industry-leading rate

Features an electronic table of contents to negotiate the forms of an NDA, with full title and text search capabilities

Allows portable review with a full-

Has your company used IT to work in a more collaborative manner? Senior Writer Mindy Blodgett would like to hear about it. Contact her at mbloodgett@cio.com.



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CORE BUSINESS
Consumer finance

FINANCIALS
1998 Revenues:
\$10 billion

EMPLOYEES
10,000

URL
www.household.com

Bucking the industry norm of paper-based loan approvals, HFC completes the process in minutes and raises customer awareness

BY DEREK SLATER

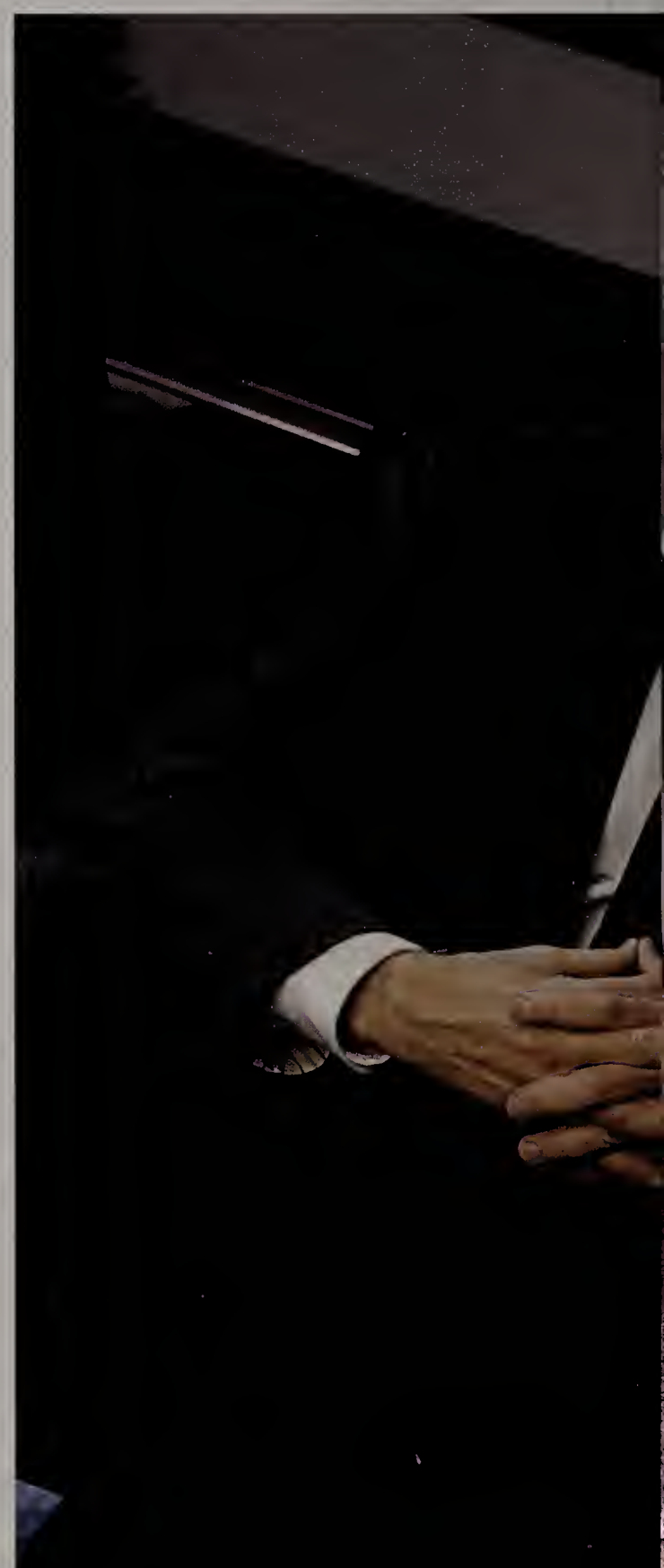
Loan Star

“Need a loan to finish building your new house? Have a seat, have a seat. Now, let’s take a look at your credit. Hmm, if you borrow \$50,000 at 8 percent, that puts you over your risk cap. Maybe we can reduce your total indebtedness by paying off those three credit card balances you carry. Then we’ll recoup

the expense in interest by adding a half-point to the house loan. Just checking the math.... No, that won’t work. What if we try...”

Consumer loans are what you might call a pens and needles business: lots of uncomfortable moments waiting for approval—much of it watching the salesman (account executive, or AE) calculate and recalculate percentages and principals—followed by the

ritual signing of a few reams of documentation. Household Financial customers, however, have an easier time of it. They don’t have to wait long for loan approvals, and their account execs don’t need scrap paper. Household’s Vision system integrates all phases of the process from lead to loan and connects to an intelligent underwriting engine that returns verdicts in minutes rather



than the industry-standard hours or days.

Household offers auto loans and credit cards, including private label cards for businesses like Best Buy and General Motors, but its biggest business unit in terms of revenue is the consumer finance division, which does equity loans. This industry is undergoing rapid consolidation. In mid-1998, for instance, Household acquired Beneficial Corp., one of its largest competitors, creating the HFC and Beneficial divisions with 1,400 branch offices dispersed among 46 states. The twin keys to compet-

itiveness in this industry are efficiency and customer intimacy. That means selling and servicing the maximum number of financial products with the lowest operating overhead—all without making the customer feel like a number.

The Vision system has helped Household improve in both of those areas. Sales have increased by more than 10 percent per account exec. AEs spend less time on paperwork and administrative hassles and use the system's lead management functionality to

Defining VALUE

Household's Vision system helps the company reduce loan approval time, simplify regulatory compliance and cross-sell new products. Deployed in January 1997, the application cost \$83 million to build and has resulted in a 10 percent to 18 percent increase in sales per account executive. It also enables Household to assimilate acquisitions efficiently in the rapidly consolidating consumer finance industry.

provide customers with better-targeted product offers. Household totes a five-year return on investment of 129 percent—and because of the system's neural network engine, its benefits are just beginning.

Historically Speaking

Consumer finance companies have historically been reluctant to invest in technology because loan products are complicated and subject to heavy regulatory restrictions. "Perfecting" an equity loan, the industry jargon for finishing all the steps necessary for regulatory compliance, requires the proper signatures on an imposing set of meticulously prepared documents (deed of trust, repayment and security agreements, and so on). The laws governing the industry differ by state, and in some cases even by county. Underwriters—who structure the terms of loan agreements—vary in the scope of deals they can approve. And countless variables play into the loan approval decision—the consumer's income, employment history, credit history, outstanding debts and the like. Capturing all that complexity in a software

LENDING SUPPORT Ken Harvey (left) and Tom Detelich.





application is daunting.

But around 1994, Household's head of consumer finance, Bob Elliot (who has since retired), predicted some forthcoming changes in the industry, particularly the consolidation of many lenders into few. Elliot wanted Household to compete by offering faster underwriting decisions than its rivals did. If, for example, a Household customer needed a loan of such scope that the local branch office

was not authorized to give final approval, all the papers of the proposed loan were shipped to another location, which meant the customer waited even longer. Clearly Household could get a leg up on the competition if the branch

AE could use technology to put that application in front of a central pool of underwriters while the customer was still in the office.

Elliot's thoughts about the changing nature of the industry and his desire for greater efficiency were the starting point

going to have to write this [system code] 59 times," Harvey says—roughly one version of the system per state, plus a few Canadian versions, to meet the local regulatory demands. The better solution, Harvey realized, was to create an object-oriented architecture for the sys-

The twin keys to competitiveness in this industry are efficiency and customer intimacy.

for the Vision system. At that time, Ken Harvey, now Household's CIO, was in charge of application development. Harvey contemplated with some dread the prospect of building such a complicated system. "I thought, 'Gee, we're

tem. Every functional version shares a common foundation of objects, with custom tweaking done only to the necessary modules.

The challenge was that object-oriented development takes longer and therefore costs more. "Hard-coding a decision tree would have been cheaper and faster, no question," Harvey says. The price tag for the three-year initial implementation was \$83 million. "At 2 cents per share [of Household stock], the investment certainly drew attention," says Harvey. That's a whopping technology investment in a paper-based business.

"I give [Chairman and CEO] Bill Aldinger credit. He realized we could leverage our investment much better" with the component-based architecture, Harvey says. Harvey made the pitch, Aldinger bought in, and work commenced on the Vision system in late 1994. "It took courage to make the investments that were counterintuitive in this industry," agrees Enterprise Value Awards judge Patricia M. Wallington.

Harvey says Vision required three years from the inception of the development work to the full conversion of all functions. Rick Erickson, Household's director of advanced technology, led the development of the software components for the middleware and messaging system and Kathy Mikos, vice president of business development led the development of the system using Sy-

Anatomy of THE SYSTEM

HARDWARE Central processing is performed on an Amdahl Millennium mainframe and two redundant Sun Microsystems E10000 servers. Each local branch office hosts a smaller Sun server running Sybase's relational DBMS, a dual-sided laser printer (which is key in the heavily document-oriented insurance business), and Pentium-class PC workstations for individual account executives.

SOFTWARE Vision is an object-oriented system built with Powerbuilder Foundation Class Development Tools, Electronic Forms Systems' software for form design and printing, and Asymmetric Icon Author. The messaging layer connecting to MVS environments is a homegrown Cobol system called the Global Transaction Manager. The neural network engine for underwriting decisions is based on technology from Hector Neilson Corp. and Fair, Isaacs & Co.; Hector Neilson Corp. exclusively handles fraud detection. Strategyware from Fair, Isaacs & Co. is also the basis for the system's suggestive selling component.

NETWORK Vision runs over a single virtual North American IP network provided primarily by AT&T and using Cisco routers and IBM's MQ Series messaging middleware. Network management is handled via Computer Associates' Unicenter TNG environment and monitoring tools from Candle Corp.



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base's Powerbuilder client/server development toolset. In mid-1996, Harvey's team implemented the system in a handful of branch offices that served as test pilots. Deployment to all branches was completed in January 1997.

Selling the System

Building a system is only the first challenge, of course. Someone has to use it, and sales departments in general have a history of cool receptions for technology-based selling tools.

VISIONARIES Rick Erickson and Kathy Mikos.

That's where Tom Detelich came in. HFC and Beneficial produce the largest revenues of all Household International's operations. HFC's revenues come through Detelich's operations as managing director of sales for the HFC unit. Detelich, a 23-year industry veteran, arrived at Household when the company acquired Transamerica in 1997, just in time for the rollout of Vision. He was quick to throw his support behind the project, which helped ensure buy-in from the sales force.

Detelich says two key benefits of Vision are immediately obvious. One is the reduced training time for new AEs. The second and more compelling bene-

fit is that the system reduces AEs' administrative overhead. "Our folks spend nearly all of their time servicing customers," says Detelich. More selling time translates into more sales; when the test branches reported higher sales, the minimal resistance among the remaining AEs quickly evaporated. By mid-1999, Vision was handling an average of 11,000 new loan applications per day, amounting to 3 million transactions per day. Now, each time Household develops an update to the system, the company continues the practice of rolling out the changes to a few test branches first.

Payback Time

Again, the name of the game in Household's industry is efficiency and customer intimacy. Household's branches are selling a minimum of 10 percent more loan products than before the system rollout. Branches added to the Household network via acquisition, such as the Beneficial offices, show even better gains—as much as 18 percent. Another key measure of corporate performance in consumer finance is the "managed basis efficiency ratio," which is calculated by this formula: expenses divided by revenue, minus policyholders' benefits. A lower ratio is better, and Household has lowered its efficiency ratio from more than 40 percent prior to rollout to less than 35 percent today. It all adds up to a 40 percent total return on investment, over Vision's first few years of life.

Household continues to tweak the system as regulations change and as AEs generate ideas for new functionality. "Almost all of the impetus for changes comes from the sales force," Detelich notes. Mikos, vice president of business systems, attends all divisional and staff meetings of the sales force to





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One Vision

Household's IS team designed seven integrated modules to create a complete package

Training All training for Vision is computer-based, and AEs must pass online tests to gain authority to process transactions. Courseware is updated one month before each new release of the Vision software.

Lead management Actions and inquiries by HFC and Beneficial's 3 million current customers yield what the company calls "perfect-timing leads." Say, for example, a customer pays off her car loan and tells the service representative she plans to keep the car another year. Bing, a year later that lead pops up at the local sales branch, prompting the AE to inquire whether the customer needs to finance a new vehicle. If the customer moves cross country, the lead is transferred to the office closest to the new address.

Solicitation Vision handles all contact management activity and creation of loan proposals.

Underwriting AEs can model financial solutions using the customer's current financial information. A neural network host looks at risk, interest rate and other variables in approving loan terms. The company says typical underwriting requests are handled within minutes rather than hours or days, standard in this industry.

Closing The system generates all necessary documents on the local laser printer, including, for example, checks to pay off other lenders in the event of debt consolidation.

Perfected product Every document is bar coded and forwarded to a central loan processing facility. There the documents are scanned for imaging. The system automatically initiates a commission for the right AE, but not until all required documents have been received and scanned. That provides further incentive for the AEs to get all of their ducks in a row.

Service Vision also handles all aspects of customer service, so if a loan customer calls two months after securing a loan, the service rep can view the same information the AE did at the time of the loan process.

—D. Slater

help keep her team abreast of changing needs and new ideas. And because of Vision's component-based architecture, only those objects being changed need an update; Household doesn't have to recompile the entire application. The company can replicate new objects to the branch offices overnight with the push of a button, once it has tested the changes in the pilot branches.

The most interesting thing about the Vision system is that its neural network

components now promise benefits that even its developers didn't foresee. This is Vision's lasting value: As it learns, it helps the company make smarter decisions about Household customers.

For instance, say a credit card holder calls, irate about a late fee. He's not a profitable customer for the company: He carries a single card with little or no balance and has spurned Household offers for credit insurance products and equity loans. Why should the Household ser-

vice rep cancel the late fee? Vision knows why. The system "takes into consideration the potential lifetime value of the customer," Harvey says.

Turns out this customer took out a school loan six years ago and a small auto finance deal for a used car three years ago from another company. His modest income has gone up significantly two years running. Considering these variables, Vision can recognize this late fee as a first offense by a recent college graduate who handles his finances well and may be in the market for significant new loans in the next year. Vision authorizes the service rep to waive the fee. Then the system can prompt the rep with suggestive selling for this now-happy customer—does he know that Household can pay off that old car loan and offer attractive terms on a loan for a newer vehicle?

"If you'd asked me about suggestive selling six months ago, I wouldn't have known anything about it," says Harvey. This feature is expected to create a higher level of value for the Vision system, which is important because Harvey, for one, believes the company is pretty close to offering the best efficiency it can deliver. "The next growth is top-line growth through lead management and suggestive selling," he says.

Taken in sum, the system ties the company more closely to existing and prospective customers. Loan approvals are faster, sales proposals more targeted and customer service more responsive. Cutting out the waiting game and creating more desirable products helps Household forge a customer intimacy that ultimately translates to profits, which in today's stock-market-driven environment is the ultimate in enterprise value. **CIO**

What other consumer experiences—like awaiting loan approval—beg for IT-enabled reform? Executive Editor Derek Slater can be reached at dslater@cio.com.



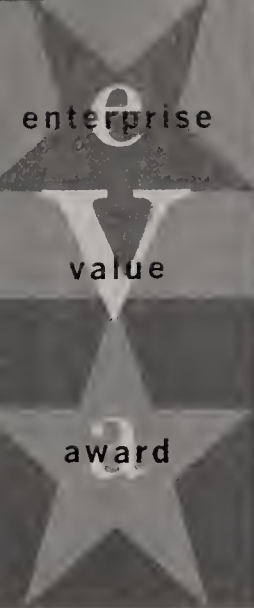
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**When it comes to assessing value,
our Enterprise Value Award judges
and process team know the score**

BY ELAINE M. CUMMINGS

Judgment Call

As early as 1993, *CIO* recognized enterprise value by what we dubbed ROIT—return on investment from information technology. Of the six winners that year, one—Texas Instruments—had sufficiently consolidated its purchasing activities into a single system to reduce labor costs and shorten product cycle times.

Another—The Perrier Group of America—quenched its customers' thirst for improved service by combining redundant standalone branches into regional centers.

But the Enterprise Value Awards have come a long way since then. And so have our honorees. Companies are no longer automating the way they work so much as they are *changing* the way they work. In fact, a look at this year's winners shows that a system like

Charles Schwab's Internet Trading Customer Center is changing how an entire industry—not just a single company—operates.

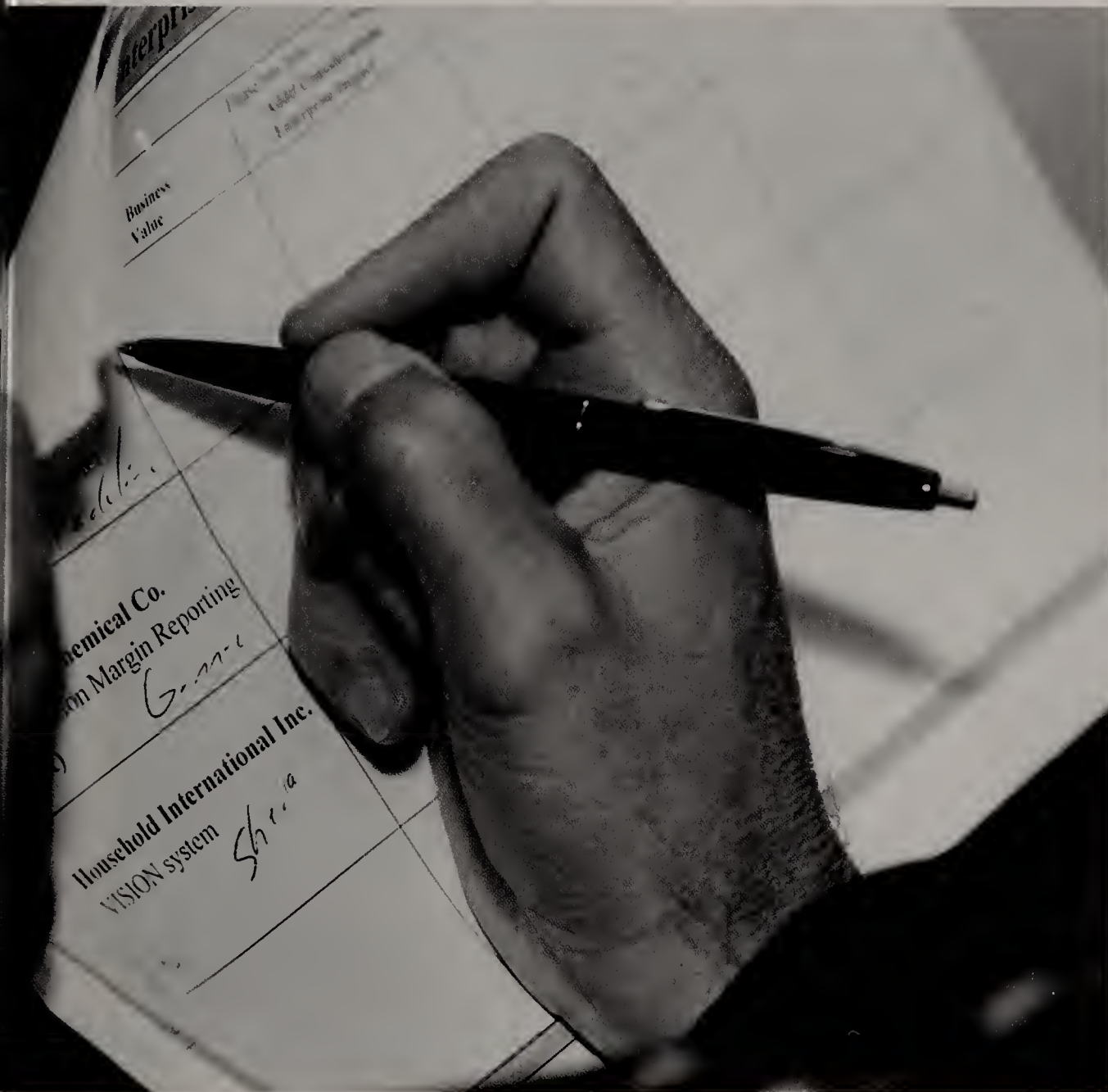
The Enterprise Value Awards judges admit that they are amazed at how each year's success stories serve to raise the bar still higher for next year's finalists. "The winners have developed some of the most rigorous processes in their industries," says third-year judge Chris Hoenig, president of Exolve, a

consultancy. "These companies have figured out how to squeeze business value out of IT in an impressive way."

But getting there wasn't easy. This year's winners endured a particularly tough due-diligence routine. Last summer, *CIO* editors got together with the award's seven-member process team, an expert group of IT practitioners and consultants (see inset), to examine dozens of applications we received from



PHOTOGRAPHY BY FURNALD/GRAY



GREAT MINDS Clockwise from top left, The Judges: Chris Hoenig and Peter Solvik, Gregor Bailar, Patricia M. Wallington, and John Glaser. Below from left to right, The Process Team: Virginia Reck, John Storck, Richard Swanborg, Shelia Smith, Mary Silva Doctor, and Madeline Weiss.



ILLUSTRATION BY BETHANY GULLY

Courtly Crew

A look at this year's judges and process team members

Here are the members of the process team and the judges who helped make the 2000 Enterprise Value Awards the best yet.

The JUDGES

Gregor Bailer

Senior Vice President and CIO
National Association of Securities Dealers
Rockville, Md.



John Glaser

Vice President and CIO
Partners HealthCare System
Boston



Christopher Hoenig

President
Exolve
Washington, D.C.



Peter Solvik

Senior Vice President and CIO
Cisco Systems
San Jose, Calif.



Patricia M. Wallington

Former CIO
Xerox
Stamford, Conn.



The PROCESS TEAM

Jim McGee

Partner
Diamond Technology Partners
Chicago



Virginia Reck

Executive Vice President
Kendall Consulting Group
Andover, Mass.



Mary Silva Doctor

Executive Director
Icex
Boston



Sheila J. Smith

Managing Partner
Omega Point Consulting
Palm Beach Gardens, Fla.



John Storck

Assistant Professor of IS
Boston University
Boston



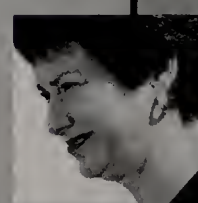
Richard Swanborg,
*Cochair, Enterprise Value Awards
President and Founder*

Icex
Boston



Madeline Weiss

President
Weiss Associates
Bethesda, Md.



awards contenders. Together, editors and process team members set about their task of narrowing the field by making sure that each applicant met the required entry criteria, including that the system in question had been operational for two years and that it could demonstrate significant ROI and a decisive business impact. To make sure the finalists passed muster, the process team visited company sites and conducted interviews with sponsoring executives and business users to explore the claimed value, validate the results and then present their findings to the award judges.

The judging took place at a daylong October meeting at the Boston Harbor Hotel. Judges debated the merits of the 11 finalists before finally selecting five winners and one honorable mention. In reaching their decisions, the judges considered several qualifying conditions. The project must have **Benefits** derived from the innovative use of IT

Produced measurable, demonstrable and verifiable results

Exemplified the types of initiatives that CIOs in the industry would be proud to have accomplished

Favorable comparisons with prior winners—not just stand out among the other applicants

Ultimately the judges' decisions were enhanced by the filter of their own perceptions and experiences. They based their final vote on a few key points: Did the system in question have impact on company objectives? On the industry? On the community? Was it innovative? To what degree were the actions either courageous or unique? And what, if any, was the project's lasting value?

When the judges came to the table to pick this year's winners, they understood that lasting value would come in many shapes and sizes, but when done right, it would transform a business, or at least a process. "First and foremost, you must

understand business value. Knowing how to achieve it, even knowing what it looks like six months in the future, is a challenge for any company," says first-year judge Peter Solvik, senior vice president and CIO of Cisco Systems. "The speed of change is always increasing, and you can't always predict what the next type of value is going to be."

By creating an award that honors the people behind such uniquely innovative solutions, *CIO* hopes to bring to the forefront the role models for IT excellence in all industries. "What makes this award unique is the intensity and overall honesty of the process," says Richard Swan-

borg, president and founder of Icx in Boston and Cochair of the Enterprise Value Awards with *CIO* Editor in Chief Abbie Lundberg. "Since the process team digs out the facts, and the judges review the applications only on the merits of the case, the winners can be assured that they truly deserve this recognition." **CIO**

Application forms for the 2001 *CIO* Enterprise Value Awards can be found in upcoming issues of *CIO*. A copy of the application form can be downloaded from www.CIO.com/eva. Deadline for entry is June 15, 2000. For more information, contact Lisa Kerber at 508 935-4449 or via e-mail at kerber@cio.com.

A Star Is Born

The Enterprise Value Award, itself, matures into a symbol of lasting value



Meet Jon Schackmuth, artist, designer and the creator of the elegant brushed-aluminum star that has come to represent the Enterprise Value Award.

Based in Fairhaven, Mass., Schackmuth was enlisted in 1997 to help *CIO* conceive the multifaceted trophy to help commemorate the truly exceptional accomplishments each winner made to IT innovation.



Composed of three separate pieces of metal held together with industrial bolts and anchored in a black resin base, Schackmuth's star embodies the vision of the Enterprise



Value Awards. "To me, it is a symbol for all that a corporation needs to be," Schackmuth says. He decided right away that no one piece alone would create the shape of the star, but that it would be formed by joined pieces to represent the team-



work, the collaboration and the alignment of the IT projects. "The three aluminum pieces are agile and balanced and catch the multiple colors reflected in the foundation," he says, "and yet as a whole, the star exudes a tough, ready look."

—E.M. Cummings



the importance of being Out

The root of creativity is
outrageousness, declares the
cofounder and chairman of Creative
Thinking Association
of America

THE SELF-PROCLAIMED DEAN OF CREATIVE THINKING, Mike Vance, believes he knows how to stir creative juices in CIOs. He's authored several books and worked with many of the 20th century's most influential thinkers, including Walt Disney and Steve Jobs. He's helped high-tech companies such as Sun Microsystems and IBM, as well as old-fashioned stalwarts Johnson & Johnson and General Motors, find new ways of approaching their markets. *CIO* asked Vance to share some of his ideas about creativity.

CIO: How can a CIO leverage your methods of creative thinking?

VANCE: In one of my books, *Think Out of the Box* [Career Press, 1995], I start with the premise that we live in an era of technological abundance and psychological poverty. I call it the techno-psycho gap. The big challenge for all of us involved in leadership in this industry is to close the gap. How? Educating and helping people come along is the best way. Sometimes we do a lot of superficial things that don't have much effect. Underneath it all, companies

ILLUSTRATION BY RICCARDO STAMPATORI

outrageous!

BY TOM KANESHIGE

have kept the old organizational formats in place even though new technologies have made them obsolete. That has caused a lot of heartaches and problems, which have often gone undiagnosed.

What do you mean by a techno-psycho gap?

Take e-mail, for example. E-mail opened up extraordinary possibilities. However, since there was very little discussion about how to manage that e-mail, it became a sort of competitive game. People e-mailed back and forth and weren't reading the mail they got. In many companies, it's gotten to where people don't want to even look at their e-mail anymore. The whole problem stemmed from the lack of education about what e-mail was and how it worked. Those who didn't educate people have gotten into trouble.

When did you first see education as a creative tool?

I was one of the 20 or 30 people who helped start Apple Computer. We had to really educate our user [about this new product and how it could be used]. We published magazines and created a help desk. I think these things contributed tremendously to Apple's early success. It's hard to break away from whatever you've been brought up on—especially when the new paradigms are really different. That's why the whole emphasis should be on spending the money and the

time on education. Most people will spend as little as they can in as short a time as possible, but then you pay the price later.

Aside from education, what other areas might CIOs think about more creatively?

There are three things that we need to address and change. First is the physical environment where people are working. The second is how we interact with people, in terms of communicating and organizing. The third is the way products are developed and brought to the marketplace. To address all three of those needs at once, we recommend setting up a team center or group-groups, replacing the old meeting room with a specific resource-rich environment that uses highly visual practices, such as story boards. A team may have offices or workstations around a room, and yet you can stand in the middle and know the entire scope of its project in real-time, without having meetings or generating more reports. Increasing speed, being more adroit sounds great. But how do we do that? Reduce the number of meetings by 80 percent. That's what the group room really does. I believe this trend started back at Walt Disney in the 1950s. There were five floors accommodating 5,000 people and many team units. Walt could walk up and down the floors any day and know everything that was going on—and never have to talk to anybody.



Is there a downside to that?

Some people don't like to have their work exposed in front of everybody, either because they're very private or not doing very

much. Usually it's the latter. It's a very open and nonauthoritarian methodology. It doesn't fit in the hierarchical style of organization. On the other hand, I think it's catching on today because of our boundless culture. It has enabled us to get out of the old organizational form.

How does one become more creative?

First of all you have to be outrageous. If you can't be outrageous, forget about it; sit back, be one of the boys, and go with the flow. But if you want to make something happen, you have to be outrageous. For example, when we did "Pirates of the Caribbean" [at Disney], someone said that we should have frogs in the environment. Of course, it doesn't sound outrageous now, but it was at the time. Walt, who was outrageous, said, "What a great idea." You have to go beyond what is acceptable. Unwillingness to do that is the biggest risk of all. **CIO**

Had an out-of-the-box idea lately? Share it with Tom Kaneshige at interview@cio.com.

Sharon McCracken still remembers her stomach lurching as she heard the news: Her boss wanted her to receive professional coaching. That was one way to spoil a lunch.

"The people I knew who'd received coaching needed it because they were really bad managers," says McCracken, vice president of information technology at Twentieth Century Fox, in Beverly Hills, Calif. "I viewed this as a probationary thing."

That's not how Justin Yaros, McCracken's boss and Fox's CIO, perceived things. After all, he wouldn't have promoted McCracken to head the entertainment giant's worldwide IT effort if he didn't think she had the necessary spark and sparkle. But as he saw it, McCracken hadn't yet assumed the characteristics of a senior executive. "He sat me down at lunch, said he wanted to hand more projects to me but felt he couldn't because I was managing at too low a level, and he wanted me to take advantage of coaching," remembers McCracken. "I looked at him and thought, 'You're trying to tell me something.' I thought he had a hidden agenda."

McCracken felt cornered.

For the rest of the lunch, Yaros worked to assuage her concerns. But it wasn't until he told her that she, not he, would decide what to improve and that everything would remain strictly confidential between her and her coach that she reluctantly agreed. McCracken called Susan Cramm, president of Valuedance, an executive coaching company in San Clemente, Calif.—the same coach Yaros used for his own personal fine-tuning.

"Because I knew Susan had been Justin's coach, I was prepared to be guarded with what I said to her," admits McCracken. "Instead, we had an immediate chemistry. I feel I can trust her completely. That's

*From left: Sharon
McCracken and
Susan Cramm*

Learn how an executive coach can

- Help you navigate corporate hierarchies
- Serve as an objective sounding board
- Turn managers into leaders

PHOTO BY CHRIS CORSMEIER

COACH



To fit in with the ranks of upper management,
some CIOs need a little help from the sidelines

BY ROCHELLE GARNER

WORKS

allowed me to get instant value out of every hour we've spent together."

And they have spent many, many hours together, working hard to figure out the tasks McCracken should and should not handle in her busy day, learning how to build business alliances and, in general, ratcheting up her leadership proficiency. Focus on "leadership"—it requires a completely different set of skills than those needed to manage effectively. McCracken didn't need to hone her management acumen; she didn't become head of international operations—overseeing the applications and systems that support 64 offices and six different business entities each with its own mini-CIO reporting directly to her—without enormous management talent.

But as so many other successful IT executives have discovered, everything changes when you reach the more-exalted heights of a corporation's hierarchy: Instead of technology's concrete answers, IT executives must contend with the ambiguities of high-level politics and shifting corporate influences. Instead of day-to-day tactics, they must stay focused on long-term strategy even as they contend with overwhelming time demands that divert their attention. Perhaps most important, they must make the mental transition from functional boss to general manager, with an eye toward the well-being of the overall business.

What's a beleaguered IT exec to do? If she's lucky, she can turn to a trusted colleague for advice. Chances are, though, no executive inside the company has the time or the inclination to mentor anyone through all the corporate minefields. Besides, a ranking colleague—no matter how friendly to your cause—rarely casts a completely objective eye on a situation.

Which leads us to an executive coach, someone who's walked the same walk, talked the same talk and can provide honest and helpful perspectives for negotiating a company's brambled pathways.

"Executive coaching with the right person can provide something mentoring can't—an objective, nonbiased view of the com-



"The coach will challenge a lot of my assumptions, asking questions that really sharpen my business plan."

—SHARON MCCRACKEN

pany," says Yaros. "I see it as a [prerequisite] for a high-value executive to break through to a new level. To me, this is truly for the higher-level individual, who doesn't need to learn how to become a people person or develop time management skills. What they need are leadership and other executive development skills. And there are few people in an organization at this level who can teach that."

Do as I've Done

THOSE ARE PRECISELY THE SKILLS McCracken is learning from Cramm—former CIO of Taco Bell, one-time CFO of Chevy's, president of Chevy's-funded WrapWorks and holder of an MBA in

finance and marketing. With that kind of well-rounded experience, Cramm has a decidedly practical bent. Instead of working solely on a client's soft skills, she also trains her attention on results. How? By first figuring out the executive's business objectives (emphasis on business), determining the obstacles hindering those goals, developing an action plan and then helping clients hone their hard and soft skills to hit those objectives.

"One reason I'm so positive on the coaching is we haven't done just the psychoanalysis of my style. We also work on my day-to-day activities," says McCracken. "Susan will challenge a lot of my assumptions, asking questions that really sharpen my business plan, and then help me articulate what that

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piece of the process provides. That's good because some of this is a stretch, and working on it in detail helps me stay ahead. It's more than just talking about it. We are working through it together."

But it's not just the doing that's at issue for McCracken. It's also becoming a leader of others. To aid that, McCracken submitted herself to a leadership survey, where Cramm polled her boss, her peers and her subordinates to rate how often she demonstrated inspiration and leadership. McCracken was surprised at some of the answers.

"I'd always thought articulating a vision was part of my makeup, but my group didn't feel I'd talked about where we're going or provided any future perspective," says

McCracken. "When I told Susan how surprised I was at that she looked at me and said, 'Give me the compelling image of the future you think you've shared.'" Well guess what? It wasn't that compelling. That was a dramatic realization for me of what I'm supposed to be doing, combined with the whole concept of leadership and inspiration."

Fine-Tuning

DESPITE HER INITIAL MISGIVINGS, McCracken has become a coaching convert—crediting her work with Cramm for making her a more effective business leader. Of course, it helps that she was at the right stage in her career. And that's a key issue:

How do successful managers know when to tap the expertise of an outside coach?

Clearly, transitioning to a more challenging role represents a good time. So, too, when executives assume a role with no clear-cut definition. A coach could be in order when executives decide to sharpen their skills for the next new thing, or when they just want help setting the proper business goals—fine-tuning what, for the most part, already works. Or maybe they are so completely overwhelmed that they need a trusted outside expert to point out the land mines before they hit them.

"At that very top level of a major company, it's hard to get good feedback because you hold people's careers in your hands," says David Dotlich, senior partner of CDR International, an executive coaching and organizational development company in Portland, Ore. "A coach can gather information about that person's blind spots, and also advise the executive on what to do with it. And that's where coaching is an art, not a science. Because the coach has to say this is what other CIOs, facing similar problems in similar companies are doing."

Presumably, Dotlich and his company are true artists, given that CDR's 20 executive coaches are working with the top management at such companies as Johnson & Johnson, Levi Strauss, Nike and The Limited — not to mention working with the top 2,000 executives from Bank of America and NationsBank as the two organizations undergo the largest bank merger in the country.

Dotlich himself coaches Bank of America's CIO, formerly CIO of NationsBank. Like many executives at that rarified plane, Bank of America's CIO declined to comment. But Dotlich would. When asked the question, "Why is the banking world's leading CIO working with him?" His answer was straightforward: The better to cope. "The demands coming their way tend to overwhelm CIOs," says Dotlich, previously executive vice president of IT vendor Groupe Bull in Paris, and a certified psychologist focused on balancing the demands of career and life. "For years, CIOs tried to get into the party and

The Right Fit

These days, all sorts of people can call themselves professional coaches—and all sorts of people do, be it psychotherapists fleeing penurious HMOs, human resource professionals, business consultants, organizational development specialists or retiring executives. That makes finding a coach a rough proposition. How does someone find the right coach, given so many choices? The first step is knowing the kind of coaching you actually need. Looking for a coach skilled in honing your emotional well-being as you work your way up the corporate food chain? If so, cast around for someone with a background in psychotherapy. Do your underlings pull straws to see who has to interact with you? Then by all means hunt down a coach adept at organizational development. And you have two choices if your growth plans emphasize improvement as an executive: You can hire someone who hails from the executive community. Or you can find a professional coach whose rolodex includes mentors that can be called in, as needed, even as the coach helps you through unfamiliar organizational and HR minefields. Once you hone in on the kind of coach you need, you still have to find the right individual. Probably the best locating technique is word of mouth. After all, if a coach worked for someone you know, she could work for you too. Other sources to find an executive coach include:

- ▶ Internal Coach Federation, 888 ICF-3131, www.coachfederation.org
- ▶ Professional Coaches & Mentors Association, 562 799-2421, www.pcmaonline.com
- ▶ American Coaching Association, 610 825-4505, www.americoach.com
- ▶ Valuedance, 949 361-3096
- ▶ CDR International, 503 223-5678, www.cdr-intl.com
- ▶ People3, 732 563-2222, www.gartnerweb.com/public/static/consulting/p3_home.html

Consider this list a good first start. Just remember, this is a field dependent on personal chemistry, personal trust and confidentiality. That's why it's so important to interview potential coaches to see how well your personalities mesh.

—R. Garner

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now they are actually hosting the party. They have to look at the needs of the company three to five years out. Keeping them on that agenda is what coaching is all about.”

Choice Is Good

AT LEAST, IT'S WHAT DOTLICH'S BRAND of coaching is about. Oddly enough, the word *coaching* has assumed an almost contradictory hodgepodge of meaning and practices. “People mix up coaching, mentoring and consulting,” says Rich Fettke, president of Fettke Success Development Group, in Lafayette, Calif., and spokesman for the International Coach Federation (ICF), the world's largest association of personal and

executive coaches. The differences? According to Fettke, a mentor has the same business experience as the client. A consultant tells clients how to be more effective. And a coach works with the client to reveal and build on his or her strengths, improve performance and enhance quality of life. Today even psychotherapists, escaping the vicissitudes of managed care providers, are calling themselves coaches.

“Coaches look at the business side and, at the same time, look to see whether [clients] are working too many hours, examine their time-management effectiveness, their fitness and their life relationships,” says Fettke. “A coach can be skilled at coaching, but not as experienced as an executive. As a

coach, a big part of my job is to be a resource—to have an extensive database of people I can refer to, so that I can call in a mentor when the client needs one.”

Clearly, knowing what you want from a coach will determine what coach to hire. To help potential clients make sense of the coaching mishmash, the ICF has begun a credentials program. Anyone able to document 750 hours of coaching becomes a professional certified coach. Those documenting 2,500 hours can be called a master certified coach. So far, says Fettke, there are over 150 professional coaches and over 150 master coaches in the country. (For more on selecting a coach, see “The Right Fit,” Page 118.)

Sometimes, others decide for you that you need a coach. That can, as Fox's McCracken initially thought, be bad news. Sure, forward-thinking companies will call in a coach during times of transition or to spruce up an executive undergoing grooming. Usually, this sort of arrangement has a remedial focus—used by companies as a last-ditch effort to salvage ill-fitting or abusive managers.

Which is why so many senior executives prefer to be coached by someone experienced in the ways of business. Someone like Dotlich or Cramm, who help them get through their days—and their careers—intact. How? By helping them prioritize, delegate and take risks with people they might not think are capable.

Then there are the politics. “We don't teach about diplomacy, but we do teach CIOs how to link their agenda to reach the right people to succeed,” says Dotlich. “You have to think about the sources of resistance, the supporters and the neutral parties. We often do political mapping, showing all the stakeholders, their influence and their political bent.”

Eye on the Prize

OF COURSE, NOT ALL CIOs NEED HELP juggling their day or sidestepping political land mines. Sometimes they just want an objective outsider to keep them focused on what's important. That's exactly what Joe Fink wanted—and got—from Neal Lenar-

“It's not possible to overstate how valuable it is having someone I can talk to. Otherwise you have to rely strictly on your own judgment.” —JOE FINK



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*Average indexed stock prices of publicly traded companies with a minimum \$500,000 purchase of Siebel Front Office Applications, measured from date of purchase.

Career Development

sky, president of Strategic Transitions in Woodland, Calif.

More than an executive coach, Lenarsky is among the few career agents for high-flying executives. Like an entertainment agent, he “brands” his clients, hooks them up with prospective employers and advises them on various issues, including stock options, bonuses, internal politics and finding good staff. Perhaps most important, he also helps clients chart where they want to take their careers, and keeps them on that course.

That was the case for Fink. Previously CIO at Guess in Los Angeles, Fink had a grander vision for himself: the broad responsibilities of a general manager. He almost lost sight of that goal when another company offered him an obscene amount of money to step into its CIO role. With Lenarsky’s help, Fink stayed true to his dreams—accepting the position of vice president of operations at Nautica Enterprises in New York City. Today, Nautica’s CIO reports to Fink. And while Fink feels he’s up to the job, he stays in contact with Lenarsky.

“There’s not a month that goes by that I don’t speak to him at least once,” says Fink. “Generally, it’s because I have some political issues to think through, and I find him to be great for working things out. It’s not possible to overstate how valuable it is having someone I can talk to. Otherwise you have to wing it or rely strictly on your own judgment, and you worry about that sometimes. Neal can cut immediately to what’s at stake.”

Without question, Fink already demonstrated many of the strengths needed by executives at the top of an organization. With the encouragement and insight from his coach, he’s ready to take his career even further. And in today’s quest to conquer e-commerce—with companies placing a premium on technical and business acumen combined—he could rise very high, indeed.

Rich Chadwick has yet to achieve the same heights, but his career is definitely on the rise. Director of development information systems at pharmaceutical company Amgen, in Thousand Oaks, Calif., Chad-



Coach Neal Lenarsky helps his clients chart where they want to take their careers and keeps them on that course.

wick has been asked to apply for a more senior position within IS that oversees nearly 500 staff. Chadwick knows technology and knows the business. But while he’s taken graduate studies in finance, he’s not versed in it enough to “speak the lingo” on the executive floor. He needed someone to guide him through unfamiliar territory. A friend suggested Cramm.

“I already know the business here very well, so I can talk about cycle times and regulatory submissions [to the FDA],” says Chadwick. “Susan’s background as a CFO helps me tie the technology’s value back to our investments, since that’s driving everything inside the executive suite. I wanted to prepare myself before I’m in the job that will have me talking to the CEO and COO.”

In other words, Chadwick wanted preemptive training, with the professor all to himself. Anna-Lisa Silvestre, general manager of Kaiser Permanente Online, in Oakland, Calif., had similar issues to contend

with. As the manager in charge of the HMO’s online business, Silvestre wanted coaching about finance in particular and a deeper understanding of technology in general. Frankly, Silvestre just didn’t know what to focus on in her job. “I was always successful at what I did, but being on a national project was the big time,” says Silvestre. “I had to know how to position myself, how to frame the issues—even who I needed to meet with.” In essence, says Silvestre, she needed to practice, refine and hone her approach to people. With the help of a coach like Cramm, she has.

“I know what questions I need to ask, how to ask them, how to approach the job, how I will pull this off,” says Silvestre. “She has made me fearless.”

Isn’t that a great feeling to have? **CIO**

Rochelle Garner is a freelance writer based in San Carlos, Calif. She welcomes your executive coaching comments at rrgarner@pacbell.net.

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**In the battle between
Unix and Windows,
there's still no winner.
Arm yourself with enough
information to choose
between them.**
BY DEREK SLATER

Montagues and Capulets, move over. Windows and Unix are today's fashionable feud. Feud, in fact, is too soft a word: This is war. Still.

When last we visited the operating system hostilities (see "The Fog of War," *CIO*, July 15, 1998), the battlefield was a mess. And it's not looking any prettier these days. Unix vendors have dug trenches around a few key issues such as scalability and reliability, claiming that Windows

lags behind their OS variants in the ability to handle industrial-strength applications such as ERP and e-commerce. Microsoft has continued to pour time and money into its OS and

Deciding Factors

has declared its intent to invade Unix's turf at the highest levels of distributed enterprise computing with Windows NT, rechristened Windows 2000 in this year's release.

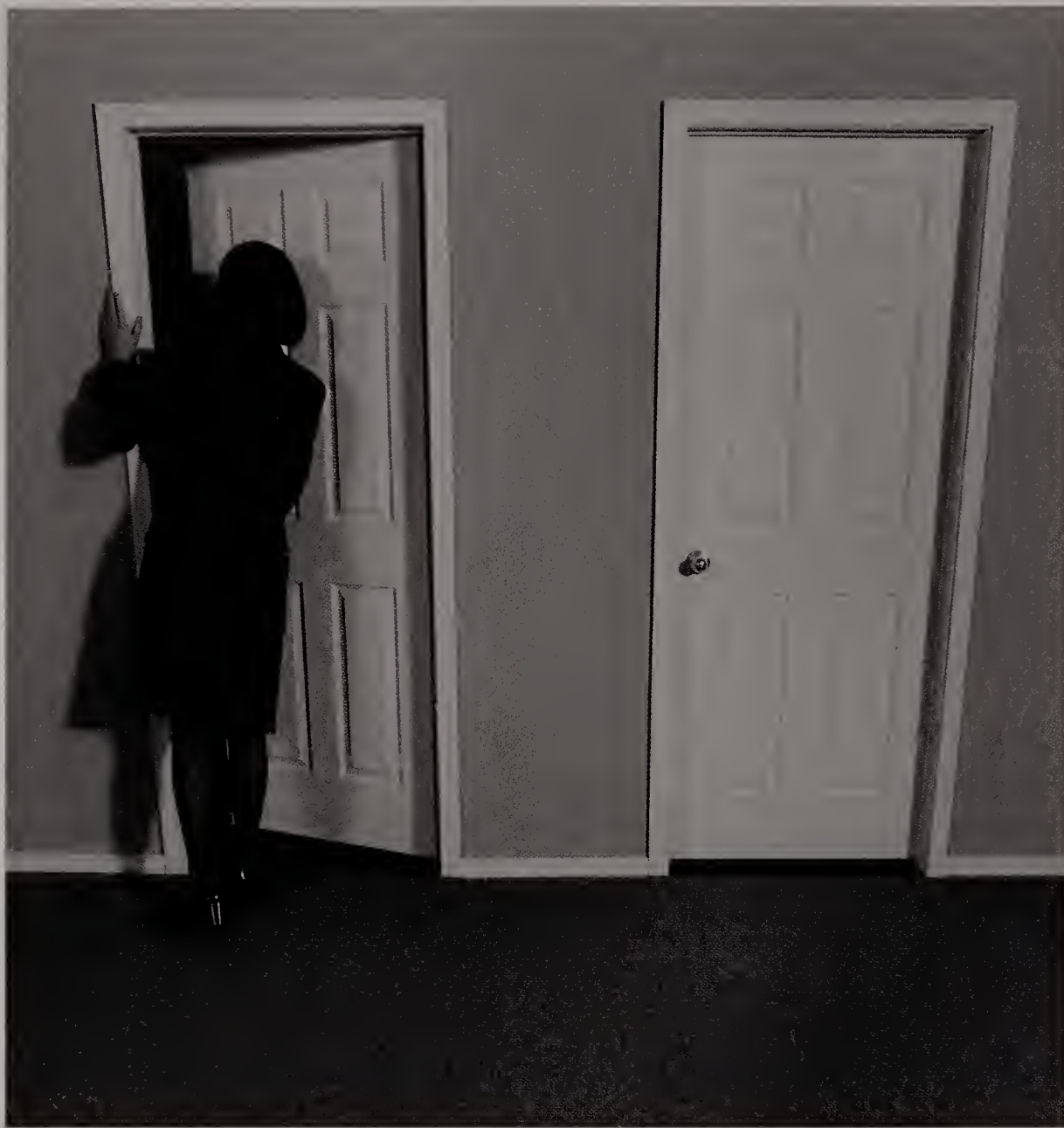
So which OS is going to win? Surprise: Neither. Laura DiDio, senior network operating system analyst at Giga Information Group in Boston, predicts both candidates will remain standing. "They seem to think, 'There's not enough room in this town for the both of us,' but of course there is." Windows' market share will grow, but Unix will continue to hold its own.

So you'll have to decide for yourself which operating system best meets your needs. But don't head to the polls unprepared. Consider the following key questions before determining where to bet the (server) farm.

Suffering operating system anxiety? Read on to learn

- ▶ What advantages Unix still holds over Windows
- ▶ How Windows is catching up
- ▶ How to determine which operating system is right for your business





The Issue: Scalability

Ask Yourself: How many users do I have per server? How much will this number increase?

► Scalability is still issue number one. When a server gets pushed beyond its limitations, the performance of the application—if it doesn't crash completely—begins to degrade exponentially as more users or requests or transactions are added. Users start measuring response times not in seconds, but in cups of coffee.

Unix still holds a significant lead in the transaction load it can handle before sending users out for a java break. The biggest successful real-world Windows NT implementations have about 850 users working concurrently off one online transaction processing (OLTP) database server, says Thomas Bittman, vice president and research director at Stamford, Conn.-based GartnerGroup. That's progress; in mid-1998, 450 was the best NT could handle. Still, for a big-league application like SAP's R/3, that gives Windows roughly one-third the scale of Unix, according to Bittman.

Windows 2000 will be even more robust. The Win2000 umbrella includes many versions, with the high end being dubbed the DataCenter version. According to Microsoft, Win2000 DataCenter increases the OS's scalability, for example, handling more SMP proces-

sors—32—out of the box than did NT—four. However, how those numbers will translate into concurrent-user support remains to be seen.

At the same time, the additions to the Windows code base raise new concerns. According to DiDio, it's bigger than IBM's robust MVS mainframe operating system. Furthermore, Windows' life is complicated by Microsoft's desire to sell it to users of all shapes and sizes. It's hard to build an operating system that runs desktops, departmental servers and high-availability enterprise servers. Putting out different versions requires more coordination by orders of magnitude than a single release. "Has Microsoft bitten off more than it can chew?" asks DiDio.

Perhaps as a result of this complexity, in the months leading up to the (delayed) release of Windows 2000, the operating system was shedding features like fleas off a shaking dog. The original plans included a database integrated directly into the OS, for instance. That feature was axed prior to release. Microsoft also changed direction on performance clustering, removing advanced clustering capabilities from the Win2000 product description and turning clustering

services into a separate software product.

While Windows grapples with these issues, Unix isn't standing still. The enterprise Unix market is defined essentially by three major variants: Solaris from Sun Microsystems, AIX from IBM and HP-UX from Hewlett-Packard. (Just off the winners' podium is SCO Unix from Santa Cruz Operation, according to DiDio.) Those vendors continue to enhance the capabilities of their software. In scalability terms, Bittman says the biggest Unix installations run up to 2,500 concurrent users. ("We know of one company that's trying to run 4,500 R/3 users on a single Unix database server," he notes, "but it's failing.") That's up from 1,800 concurrent users in mid-'98 and a far cry from Windows' 850 upper limit.

Several IS executives say scalability issues have been the primary factor in steering them away from Windows. Scott Turvey, a vice president for Nicholas-Applegate Capital Management, has 350 users or so accessing close to 100 servers. Nicholas-Applegate is a San Diego-based financial management company that takes data feeds from Wall Street and tracks the values of its investment portfolios in real-time. Two-thirds of the servers are Sun boxes, ranging from small systems up to 6500s; Microsoft NT and Novell NetWare make up the rest. "NT scales only so far," he says, and with the heavy trad-

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Bottom Line: Before signing on to Windows, make sure it can scale to the levels you need.

The Issue: Reliability

Ask Yourself: How much uptime is enough?

► Giga's DiDio says her research pegs Unix uptime at about 99.8 percent. NT version 4.0 grades out around 99.2 percent. That translates into 90 minutes of downtime per month for Unix, and seven hours or more for Windows NT per month. For bankers'-hours businesses, that difference is not necessarily significant, but for more and more companies competing on the internet's open-24-hours schedule, it can mean big bucks in lost productivity. "Our view is that [Windows] will never be as stable as the leading Unix variants, due to the business model of trying to sell this thing in many markets," says Gartner's Bittman. "If you froze Unix today, Windows would catch up in reliability in about three years."

Even more critical: Win2000 is a major release, and its first incarnation will predictably be less stable than the latest tuneup of Windows NT. Carl Jackson, IT systems coordinator at Brownfield, Texas-based Altura Energy, runs a pure Windows shop

with 1,000 users working off 75 NT servers. Altura Energy has been beta testing Windows 2000 from its inception, and Jackson says his company will wait about six months from Win2000's final release before rolling out the upgrade. "I want to give the product some time to gain stability and hear what the problems are—and unfortunately probably wait for a service pack," Jackson says. Other users echo that intention, and Bittman says they are wise to do so. "We expect Windows 2000 to be less stable than NT for a year," he says.

Bottom Line: It likely will be 2001—at the earliest—before Windows' reliability is comparable to Unix.

The Issue: Windows' new integrated features

Ask Yourself: Do I need these?

► While the scalability and reliability turf remains an uphill fight for Windows, Microsoft has a strategy for going around Unix vendors' flanks. Windows 2000 includes several features that are more tightly integrated than those of their counterparts in the Unix world. These features could play a key role in winning over users. Microsoft's secret weapons, according to Tony Iams, a senior analyst at analyst firm DH Brown Associates, are Kerberos security, active directory technology and the Microsoft Transaction Server, which is integrated directly into

ing volumes the stock market has been experiencing, Turvey isn't eager to risk performance problems by running his heaviest applications on Windows. Turvey uses the Windows systems primarily because they support applications written exclusively for NT. "If the same software runs on both platforms, odds are we will use Unix because of the scalability issue," he says.

Mike Prince, CIO at Burlington Coat Factory in Burlington, N.J., reports that refrain. The retailer runs its core transactional systems on several big Sequent (now IBM) Unix servers. Smaller departmental applications like file-and-print services are on smaller Sun boxes. "Our Sequent systems run a really high-end Unix. You can get the same box with NT, but it doesn't scale like Unix," Prince says.

But not everyone thinks Windows can't handle a tough job. CIO Arthur Tisi runs The Metropolitan Museum of Art in New York City on Windows NT servers. A museum may not sound like a rigorous transaction processing environment, but Tisi is counting on Windows to host the museum's new retail-plus-info website, which incorporates image-intensive data feeds from the collections management system and various other applications. Tisi doesn't specify the transaction loads, but he is confident in Windows' ability to run this mission-critical e-commerce application.

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Operating Systems

the operating system. A quick rundown:

- Kerberos security verifies that users on the network are valid. Its key selling point is that it does so without transmitting passwords over the network, reducing risk of interception.

- Active directory technology helps track users connected to ever-more complex corporate networks and the permissions and resources those users need.

- MTS, the Microsoft Transaction Server, serves as the manager for application and database transaction requests. When a user or client computer makes a request, MTS screens the request and, if necessary, forwards it to database servers.

Iams says these features are particularly attractive to corporate and third-party application builders. "These features are a very compelling target for developers who are working to deliver a new generation of web-enabled applications," he says; in fact, Iams goes so far as to say that that's the primary *raison d'être* of Windows 2000. Added together, these features "potentially leapfrog [Unix] in terms of support for extranets and applications where you have relationships with [outside] parties," he adds.

"Is any one of these features going to make somebody switch?" asks The Metropolitan Museum of Art's Tisi. "Probably not, but what it shows is that Microsoft is thinking properly about this." Tisi's e-commerce application, with its data integration requirements, is a perfect showcase for the usefulness of these Win2000 enhancements. "The future of IT is all about data integration," he says.

Bottom Line: Unix users can get these services, but not with the same level of integration and ease that Windows 2000 will provide.

The Issue: Staffing

Ask Yourself: Who's going to run this stuff?

► Staffing is a murky variable in the OS equation. Giga's DiDio says the lack of experienced staff for enterprise use of Windows will be OS's biggest hurdle. Tisi counters that while Unix expertise is plentiful, his shop needs something more specific—HP/UX expertise. The division of Unix adherents into various flavors makes Unix at least as hard to staff as Windows, he says. And Nicholas-Applegate's

Turvey echoes that sentiment. "When Sun comes in with new features related to clustering, you discover there are only two clustering people on the West Coast," he says. So if one system is truly a better choice in this area, it will only be because a particular skill base is more plentiful in the desired industry or geography.

Bottom Line: Determine if you have the staff to run your system of choice—and, if you don't, how willing you are to hunt them down.

The Issue: Cost

Ask Yourself: Is Windows really cheaper?

► Practitioners remain divided over the cost issue. Windows 2000, like Windows NT before it, runs happily on Intel-based hardware, which is significantly cheaper—and uses cheaper replacement parts—than the high-end hardware hosts from Sun and company. But analysts at Gartner contend that the total cost of ownership is pretty much the same, once staffing costs and extra costs to beef up Windows systems' reliability are figured in.

Tisi disagrees strongly. "If you have unlimited money, sure, go get a bunch of Onyx workstations," he says. "But in the real world it's about price/performance, and I defy anybody to deny that Windows gives better price/performance. The hardware is much more commoditized."

Bottom Line: Weigh all the cost issues—not just what you'll spend to get the stuff, but what it will cost to keep it going.

Tally Up: Different businesses will reach different conclusions. Companies with midsize transactional needs can gain some cost advantage by going with Windows and may enjoy some of the added features. Really big enterprise applications dependent on scalability and reliability still belong on Unix for now.

Of course, the boundary that defines "really big" has moved higher and higher. Already Windows' capability reaches at least to 850 users per server, with the proviso that wise men say wait nine months before putting Windows 2000 into production systems with that kind of load. How high will this boundary turn out to be when Windows 2000 gets real-world tests? The higher you test, the more risk you

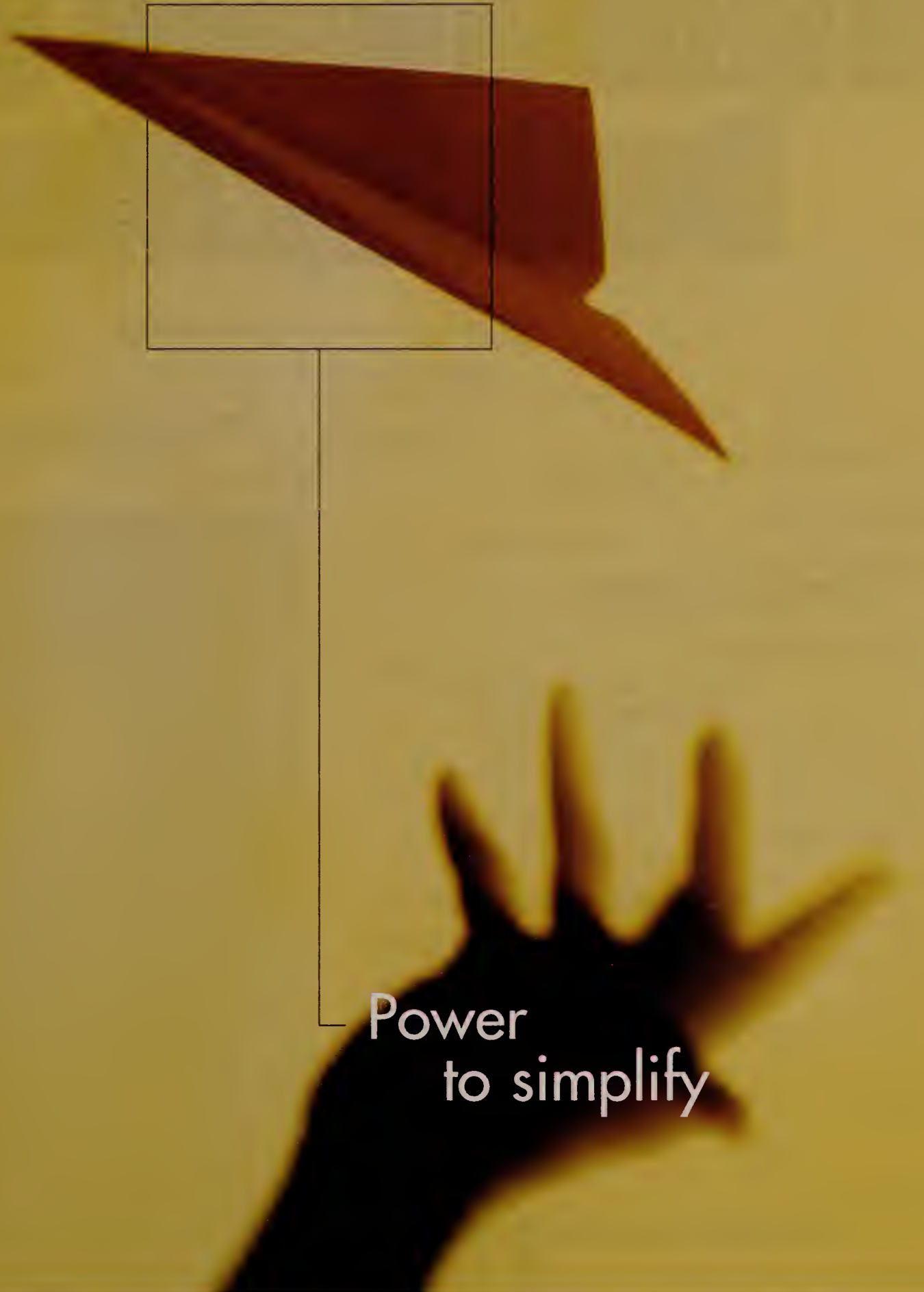
accept. Electronic commerce applications are the most difficult call to make. The tight integration of MTS and other features in Windows 2000 makes it an attractive development and hosting platform for e-commerce, but e-commerce transaction loads are the least predictable of any enterprise application. Some CIOs will use Windows' maturation to their advantage, and others will undoubtedly push too high and stumble. What will you do? **CIO**

Don't Forget Linux

While Microsoft struggles to chase Unix at the high end, it suddenly finds a new Unix variant, Linux, nipping at its heels from behind. The low end is clearly where Linux fits into the spectrum for now. It is reliable (see "Free Radicals," *CIO*, March 15, 1999) and secure but lacks much of the robust functionality of the proprietary Unixes at the high end, according to Tony Iams, senior analyst at analyst firm DH Brown Associates. "It's behind even NT in these [functionality] areas," he says. Still, as more and more big vendors jump into Linux—it's available on IBM servers, for example, and Silicon Graphics has donated the source code of its high-end journaling features to the open source cause—Linux will attempt to climb the corporate ladder just as Windows has.

—D. Slater

Derek Slater is an executive editor girding himself for an avalanche of angry Unix and Windows zealot mail at dslater@cio.com.



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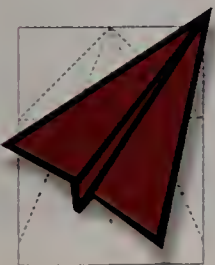
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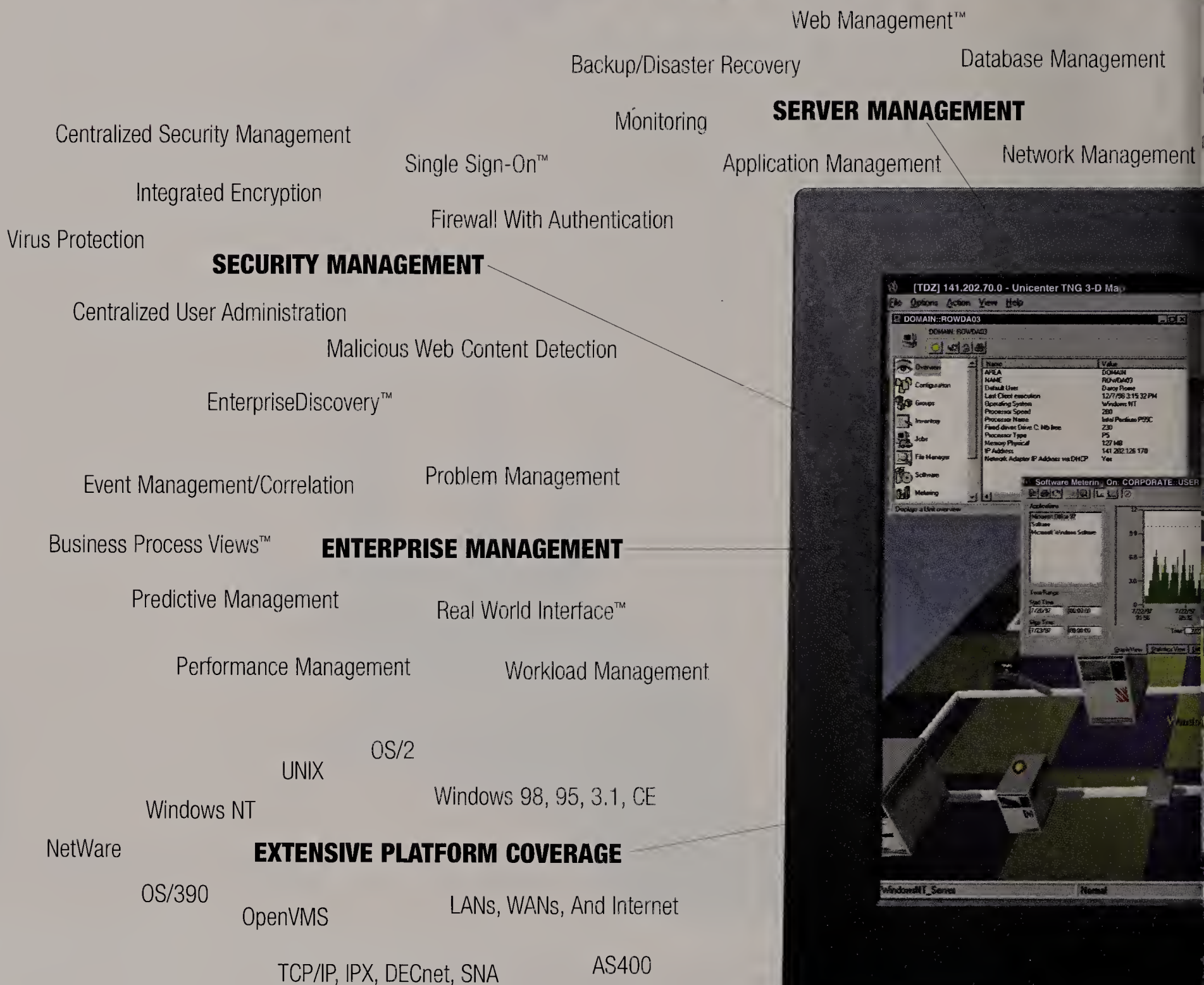
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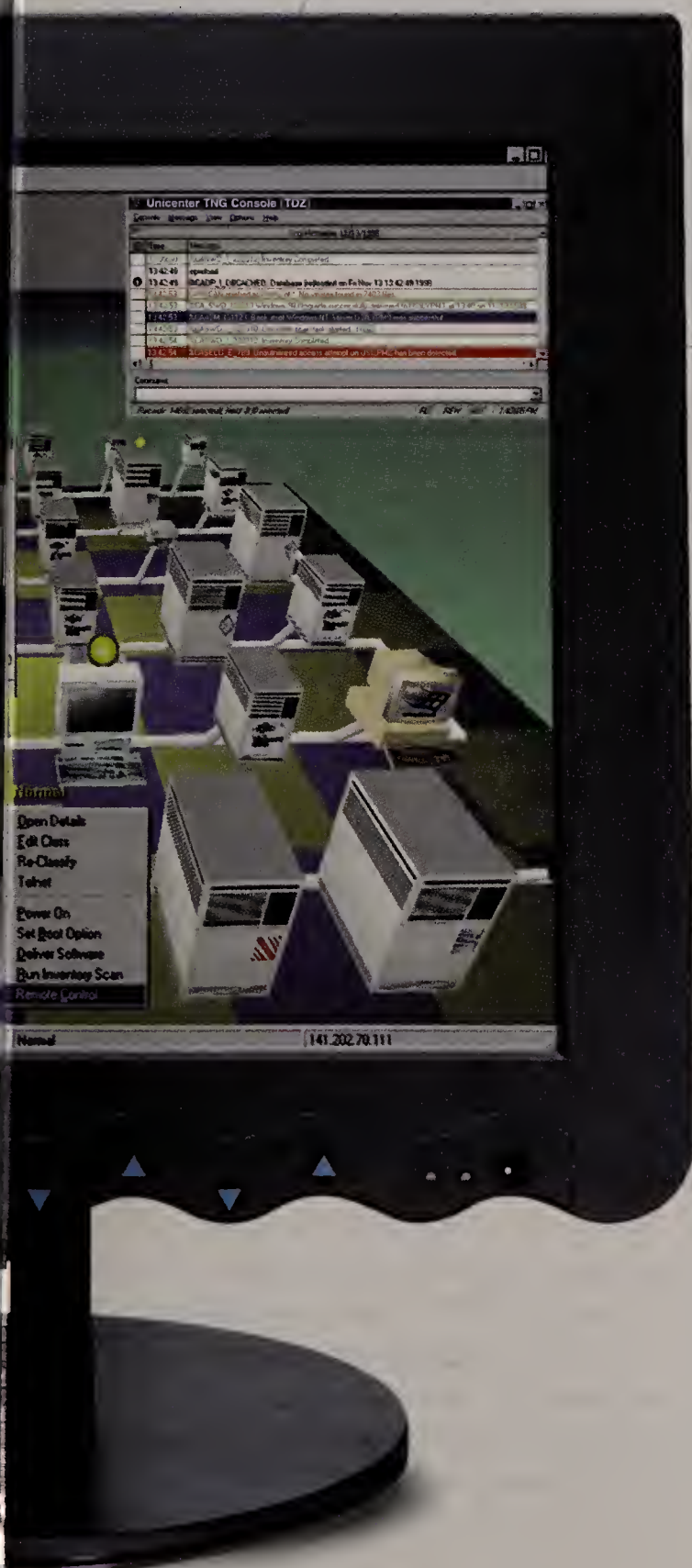
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Case Files

United Technologies

A decentralized company wrestles with sharing knowledge across borders

BY CAROL HILDEBRAND

The Company

Company United Technologies Corp. **Location** East Hartford, Conn.
Employees 142,000 nationwide **1998 Revenues** \$25.7 billion
Major Divisions Pratt and Whitney, Otis Elevators, Hamilton, Sundstrand, Carrier, Sikorsky **KM Problem** How does a company as decentralized as UTC enable knowledge sharing across its disparate businesses?

What can an engineer who designs space suits for NASA possibly learn from one who builds elevators?

Plenty, according to Jean Mayhew. The difficulty lies only in starting the conversation between them. As director of knowledge management at the United Technologies Research Center, the R&D arm of United Technologies Corp., based in East Hartford, Conn., Mayhew is charged with getting a huge—and hugely decentralized—organization to share

knowledge centrally. She admits that this is a gargantuan task for a company with about 142,000 employees and five major divisions worldwide, but the possibilities inherent in such knowledge sharing are too good to ignore.

Take the space suits and the elevators, for example. UTC owns Otis, which makes elevators, as well as Hamilton Sundstrand Corp., which is responsible for NASA's haberdashery. "People look at those product lines and say, 'What could they have in common?'" she says. But when broken down into broad disciplines, a whole field of shared concerns emerges. With space suits, Mayhew notes, "You've got materials, you've got controls, you've got understanding the human response to the environment. These issues transfer to both Otis and Carrier [UTC's air conditioning business]."

Mayhew and the KM group at the United Technologies Research Center (UTRC) started the knowledge sharing initiative in November 1998 to support UTC's objective of increasing the company's effective use of information. "We define knowledge management as the process of converting information into value for the corporation," Mayhew says. "Value can be defined as reduced costs, increases in employee productivity and product and service improvements." As UTC grew increasingly global and added new companies through mergers and

PHOTO BY CHERRY KIM

acquisitions, UTRC saw knowledge management as one avenue for boosting that value through information sharing and brainstorming.

The KM project is still relatively young; the company has spent about a year defining goals and purposes, and is now moving into implementation. Mayhew made an early decision to start small and build the effort incrementally. "One of the first things we did was scope out what's already going on [at UTC] that fits into our KM goals, because there's a lot out there," she says. Preliminary research led the group to concentrate first on UTC's engineering population. The engineers already had a cross-functional group called the United Technology Engineering Coordination Activities (UTECA), a grass-roots organization started in the '70s, dedicated to transferring knowledge across business units. Expanding UTECA's reach seemed a good place to start.

UTECA was already successful, with 18 different functional disciplines, such as artificial intelligence and engineering operations, trading information informally via channels such as e-mail or conversations. It also holds an annual conference where about 1,500 engineers from around the world meet, greet and talk geek. But 1,500 is a drop in the bucket compared with UTC's total employee base. Mayhew wants knowledge exchange participation to register in the "multiples of thousands, not one thousand," so she aims to formalize UTECA's technology discussion programs as step one of the KM project. (At UTC, the word *technology* denotes the engineering that goes into a product, not information systems.)

She says, "It's not enough for people to just get together and talk about what technology is being developed," as UTECA has traditionally done. "There's got to be a sense of impact in terms of how we are actually putting best practices into play as we go from business unit to business unit. Now we need more structure and accountability."

To build that structure, Mayhew and her group are working with John Cassidy, UTC's senior vice president of technology (in es-

sence, the top-dog engineer) to expand and formalize UTECA's knowledge-sharing programs. The group read studies about how to build communities across an organization and concluded it was vital to get senior- and middle-level managers involved in the effort. "This spreads learning out through the organization more," Mayhew says, and also guarantees a broad support for the project.

Besides, middle managers are the ones who know the experts. "They work where the most experts are and tend to have a good grasp on where learning needs to take place based on where business plans are leading us," she says.

"We define KM as the process of converting information into value for the corporation."

-JEAN MAYHEW, DIRECTOR OF KNOWLEDGE MANAGEMENT, UNITED TECHNOLOGIES



Senior VPs at all UTC divisions tapped their vice presidents of technology, including overseas personnel, to contribute their own knowledge to the project. First, these executives were charged with making sure that the disciplines currently under study are really the best topics UTC could choose. Second, the VPs had to figure out who knew these disciplines best and get those experts involved.

The VPs—about eight in all—spent time analyzing the core technology areas that are critical to both products and customers, as well as defining who the appropriate experts are. They talked to UTECA members and picked the brains of their staff and that of other business units, and recommended topics and topic experts at a meeting with Mayhew and Cassidy in December 1999. The VPs are currently fine-tuning topics and recruiting the identified experts, Mayhew says.

While the VPs identify the who and the what of knowledge sharing, it's up to Mayhew and her group to organize the how—the format of the program. She wants to build it into something more than a series of classes and take it one step further than such standard knowledge management techniques as maintaining a list of experts. "We've done classes, listed standard best practices and lessons learned already," she points out, "and we've had a directory of experts in place since 1989."

Again, the group is drawing on the UTECA veterans' knowledge to design the way the new, structured knowledge sharing program will run. "We're in the organization phase," she says. "We see us putting together projects and classes where knowledgeable people can share what they know. We see us partnering with customers and people outside the corporation, too, including academic institutions."

Mayhew isn't quite sure of the role that information technology will play in the UTECA knowledge sharing program. "One of our challenges is understanding why many of the IT applications haven't been as successful as we think they should have been," she says, and she hopes to address that by inverting standard systems thinking. "Often

when we create an application, we devise the app and then impose it on people and expect them to adapt," she says. "If you take a look at how people are naturally sharing information and then build a system that supports that, you're more likely to be successful."

Mayhew sees this program as an important goal for the United Technologies Re-

search Center to attain. As the host of the project, Mayhew says, "It's important that we provide a curriculum that attracts really good minds to cooperate and provides opportunities to expand what we know." **CIO**

E-mail Senior Editor Carol Hildebrand with your KM ideas at cjh@cio.com.

EXPERT CRITIQUE BY THOMAS H. DAVENPORT

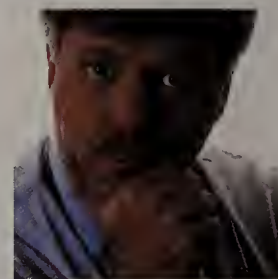
Make Sharing Pay

The United Technologies case study illustrates some difficult issues in the second wave of knowledge management. UTC has the distinct challenge of having begun some of the early stages of knowledge management in the late '70s. It's no longer content with practices many other companies are now adopting as first steps. Its situation reminds us that knowledge management isn't new, only rediscovered. But once communities of practice are in place, how do we get greater value from them? There are approaches that UTC has identified, and perhaps one promising tack that it's not pursuing.

UTC manager Mayhew realized that a key source of value in an organization of independent business units is to transfer ideas across unit boundaries. In large, diverse companies, individuals are usually rewarded for advancing their own business units, not for contributing ideas to other groups. But sharing knowledge across boundaries is a low-cost way to boost the value of the entire corporation. That knowledge transfer will probably require not only occasional face-to-face gatherings among engineers with similar concerns but also some adjustment in how managers evaluate and reward good sharers.

Another means UTC has pursued for advancing technical knowledge is focusing on the knowledge that really counts. A key aspect of any knowledge strategy should be deciding what knowledge types are most critical to company objectives. Mayhew and her team decided to focus on engineering knowledge as most important. Now they're focusing even more tightly by asking business unit engineering VPs to agree on what engineering discipline knowledge is key to success and to identify experts in those fields. This ensures that limited resources for knowledge management will be devoted to knowledge that really matters.

One angle that UTC apparently hasn't yet pursued could help expand the population of knowledge sharers. Mayhew notes that 1,500 engineers already enthusiastically share knowledge but that they represent a small percentage of the total. Such knowledge "heat seekers" go out of their way to pursue knowledge management and are willing to add it on top of their existing jobs. Most knowledge workers, however, already feel that they've got too much to do and adding knowledge management on top of their existing roles won't be popular. I'd suggest that UTC consider redesigning the jobs of some key engineers in order to "bake in" the KM duties. This will make knowledge behaviors part of the day-to-day work rather than something extra.



Thomas H. Davenport is a regular contributor to *CIO*; see his column on Page 58.



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It May Be a Small World After All

Small-footprint databases let frequent travelers specify which corporate information to take along when they hit the road BY AMY HELEN JOHNSON

Edited by Tom Kaneshige and Meg Mitchell. Send your thoughts and ideas for future columns to et@cio.com.

WHEN ERIC KENT built a laptop-based sales-force automation system in December 1996 for Simon & Schuster, he needed to fit the software—applications, presentation tools, databases, files—on a machine with a 1.2GB hard disk and 32MB of RAM. Kent, now director

of IS for English book publisher Pearson PLC's technology division in Orangeburg, N.Y., wanted to give the salespeople enough information to take on the road and make a presentation about an upcoming title to bookstore buyers in their territory. (Pearson acquired most

small-footprint databases...buzzwords...voice xml...crm...

BUZZ WORDS

PURE PLAY

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all of Simon & Schuster in 1998; both companies still use the SFA system.) Kent knew he couldn't put all the data in the company's database on the laptops, but salespeople needed information about the bookstore's account (order status, historical sales, and special handling and discounts for which it was eligible) as well as marketing information about new books, such as sales forecasts, cover art and promotion plans.

The key piece of technology that made the laptop project possible? A small-footprint database, one whose selective replication features allowed Kent to put just the data relevant to each salesperson onto their laptops and to collect the orders once the sales call was over.

More and more enterprises like Pearson are interested in small-footprint databases, says Brian Kalita, a senior analyst

at Emeryville, Calif.-based Sybase, the minimum memory necessary to hold the kernel, a fuzzy line that rests at around 2MB for laptop versions and at 50KB for a handheld database. In

many cases, the vendors have broken their databases into pieces, so users can add additional database functionality by loading another module onto their machine. What they have to weigh is footprint versus power: The smaller the footprint, the fewer the features that will work efficiently.

From Laptop to Palmtop

As Kent found when he researched Pearson's sales application, major database vendors offer some versions of their enterprise products that will run on a laptop. He chose Emeryville, Calif.-based Sybase's Adaptive Server Anywhere. Competing

new products

Putting a Spell on Quayle

Finally, the computer industry has produced a technology that overlooks the inconsistencies of the English language, hides human ineptitude and proliferates spelling gaffes—all in a single bound.

Glancing at top-level executives' handwritten memos, one thing becomes crystal clear: Correct spelling is overrated. It's no wonder these folks have a hard time finding things on the web. Typing in "stategies" instead of "strategies" on a web browser usually won't yield the desired results.

CyrshNet Technologies (yes, that's the correct spelling) has found a way around this widespread epidemic of inexcusable analphabetism. Late last year the Woodland Hills, Calif.-based software developer unveiled browser products that it claims will help spelling-dysfunctional people surf the web faster.

CyrshNet's technology enables users to enter a misspelled company or product name into the browser's URL field. Then it takes them to the right place.

CyrshNet requires no plug-ins and no special hardware. It works with any browser and virtually any database platform. Free 30-day trials of CyrshNet products are available to business websites and individual internet users. Give it a try. In the words of cyber-jester Technogecko.com: Hukt awn fonix wurkt fur mee. For more information, visit www.cyrsh.com.



Small-footprint databases offer more information in a form that's readily accessible to mobile users.

with Boston-based technology advisers Aberdeen Group, because they need to put certain types of data in the field where the workers are. What's appealing about small-footprint databases, according to Kalita, is that they offer "more information, more readily available, in a form that's accessible." And where once laptops were the only portable machines capable of running a database, technical advancements in the guise of more powerful CPUs and smaller, cheaper memory chips are enabling handheld devices and smart phones to run some form of a SQL database and synchronize that mobile database with a central database server back at headquarters.

The most common way to define a small-footprint database is by the mini-

products include Oracle's 8i Personal Edition, Microsoft's SQL Server 7.0 Desktop and IBM's DB/2 Universal Database for Windows NT.

Some of the same players in the enterprise market have already extended their product line to handheld and specialty devices; witness Sybase UltraLite, Oracle 8i Lite and IBM DB/2 Everywhere. Microsoft is also working on a version of SQL Server that will run on its Windows CE operating system. Informix recently purchased Oakland, Calif.-based Cloudscape, a pioneer in Java-based databases, while Redwood City, Calif.-based Centura Software Corp. bought Raima Corp. of Seattle, the maker of the RDM real-time, embedded database. Other vendors in the small-footprint database market include



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December 22, 1999

PointBase in San Mateo, Calif., which sells mobile and server editions of its Java-based mobile database, and Austin, Texas-based Pervasive Software, the developer of Pervasive .SQL 2000, which claims to scale from smart cards to enterprise servers.

What distinguishes laptop versions of databases from their networked or standalone desktop cousins back at headquarters, Kalita says, is that a laptop database needs a replication mechanism that takes into account the occasionally connected nature of laptops, that is programmed to resolve replication conflicts among the mobile users and that ensures data synchronization will survive a low-quality wireless or modem connec-

BUZZ WORDS

SCS

Tom Peters' acronym for "seriously cool stuff," except that Peters has been known to use a more scatological word for the second "S."

Flat Versus Flexible

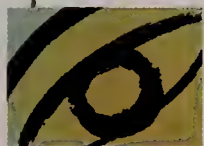
But users who are interested in putting a database on a handheld device can forget about complex SQL transactions, Kalita says. "[Choosing a] small-footprint database says, by definition, that I don't want a lot," he explains. At the most basic level, these databases are capable of displaying local data and doing inserts, updates and deletes; expect to run any cycle-

chewing queries on the central database back at headquarters and download the results.

If these small-footprint databases have such a restricted feature set, then why bother? "It's hard to convince someone that they need a database for a handheld when they have a perfectly good file system," admits Anne Thomas Manes, a senior analyst at the Boston-based consultancy Patricia Seybold Group. "The biggest competition that these small-footprint databases have is a spreadsheet."

Go with a spreadsheet if you need data manipulation capabilities, she says, but a database is the right choice when the application involves searching, transactions, data integrity, security or synchronization with a corporate database. "You get a lot more flexibility with a database," she says.

Scott Herring, a principal at the Los Angeles-based custom development house Fresh Ground Software, needed searching and flexibility when he chose Cloudscape as the database engine for the company's Music-Source Desktop (MSD) product, scheduled to debut early this year. MSD is a marketing system for music libraries and music publishers that load a CD with the MSD application and song snippets, then give it to customers who might want to license their music.



The cutting edge of small-footprint database technology runs on personal digital assistants and embedded specialty devices and appliances.

tion. But overall, laptop and desktop databases are virtually the same, he says. "Laptops are getting so powerful that it almost doesn't matter what kind of database you put on it," Kalita says. The cutting edge of small-footprint database technology, he says, runs on personal digital assistants like those from Palm or Psion, and embedded specialty devices and appliances, like a bar-code scanner or medical tool.

new products

Targeting the Traveler

Feeling the pain of the overburdened business traveler—a bit redundant, isn't it?—**Fujitsu** and **Sony** are trying to solve nomadic woes, at least on the heavy-lifting front. Weighing in at only 3.74 pounds, 11.3 inches wide by 8.8 inches deep and 1.25 inches thin, Fujitsu's **LifeBook S Series** notebook uses a 400MHz Intel Mobile Pentium III processor and up to 128MB of RAM. The machine also has a built-in 56K modem, 10/100 base-Tx Ethernet LAN and a bay for either a CD-ROM drive, a DVD drive, an extra battery or an integrated digital camera. Prices start at \$2,300. For more information, call 877 372-3473 or visit www.fujitsu-pc.com.

Not to be outdone, Sony's new **Vaio PCG-XG9** notebook, housed in a slick charcoal case, bundles a host of digital video editing features: Adobe Premiere, DVgate Motion, built-in stereo speakers and a 256-bit graphics chip for optimum audio and high-resolution images.

A bit heavier than Fujitsu's product, Sony's 500MHz-based PCG-XG9 weighs 6 pounds, has a 1.75-inch thin profile and a 13.3-inch matrix display. Estimated street price: \$3,500. To find out more, call 888 476-6972 or visit www.sony.com.

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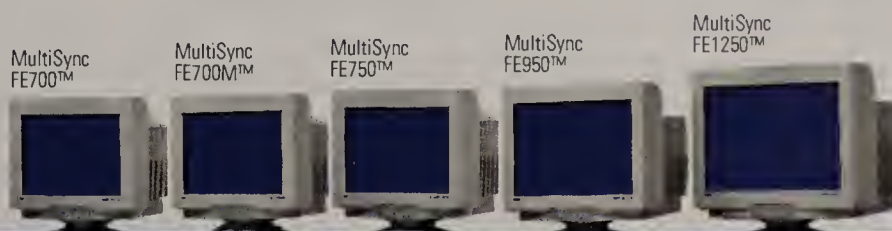
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First and foremost, Herring needed cross-platform flexibility; PCs and Macintoshes each compose about 50 percent of MSD's target market. That led him to Java. Next, he needed something small—CD-ROMs have a limit of 640MB, most of which Fresh Ground wanted to devote to music samples. The database, the

is a database in the device; ISVs usually hide all the functionality, he adds.

The Two R's

But even with the database tucked out of sight, Olofson advises CIOs to check out two things before plunking down a purchase order for a turnkey system: reliability and replication. "In the

case of an embedded device, you can't tolerate any failure at all," says Olofson. "The software has to be bullet-proof." And as for replication, it's the lifeblood of mobile applications. Data islands are useless, so "no matter what the technology," Olofson says, "the value

proposition has to include connectivity to a server."

High reliability and low maintenance are factors cited by Pat Babb, president of Sugar Loaf Software, a Sugar Loaf, N.Y., ISV that develops medical practice management software, when she describes her decision to use Pervasive.SQL 2000 in her product. Sugar Loaf builds an internet-based application, with Pervasive.SQL powering the servers in a secure data center run by Sugar Loaf. Medical office personnel access physician records over the internet using a browser on a desktop computer; Sugar Loaf is testing access via Palm and Windows CE handheld devices loaded with complementary database engines. Each device receives as much data of the most appropriate type as it can handle.

For example, a nurse using a handheld to read and update a patient's chart doesn't need to see billing information.

Babb needed a multiplatform database that required little administration but that was reliable at the same time. You don't find a lot of DBA expertise at a doctor's office, notes Babb, but the office requires the same data integrity as any



Independent software vendors (ISVs) are driving the small-footprint database market.

search system and the sound system have to eat up as little real estate as possible. That meant the database had to have a small footprint. In the end, Herring says, he had a pretty short list of candidates.

Working with Cloudscape was surprisingly easy, Herring says. "The Cloudscape piece was something we expected to be difficult and really was nothing," he says. Porting the database part of the application from its original SQL implementation to Cloudscape's Java-based SQL took only a few days.

But most CIOs will have a significantly different experience. Their application will be even easier to acquire—they'll probably buy it. Independent software vendors (ISVs) are driving the small-footprint database market today, says Carl Olofson, a research director at IDC, a Framingham, Mass.-based high-tech market research company (and a sister company to CIO). For an IT manager trying to solve a business problem, Olofson says, the likeliest approach is to buy a turnkey solution that bundles the hardware and software in one package. Most end users won't even be aware that there

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new products

Something Smaller

Mountain View, Calif.-based startup **Handspring** recently introduced its first product, a handheld computer called **Visor** that runs the PalmOS (not surprising, since Handspring's founders are Jeff Hawkins and Donna Dubinsky, who most recently worked together at 3Com's Palm Computing). Besides running PalmOS applications, the Visor product is designed to expand its uses via a special plug-and-play slot.

The technology is called **Springboard**, which lets users add modules to turn the Visor into MP3 audio players, digital cameras and pagers. Just plug these devices directly into Visor's port. Other Springboard modules available or under development include telephones, GPS systems, smart-card readers, bar-code scanners, field data collection probes and, of course, games such as EA Sports *Tiger Woods PGA Tour Golf* (sign me up for that!).

For further information, call 888 565-9393 or check out www.handspring.com.

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other business. "The data has to get to the physician quickly, but it has to be correct," she says.

Larry Chen, vice president and CTO of San Francisco-based Bidcom, also has a target market with little administration

expertise: construction crews. Bidcom's site-inspection application, based on Oracle 8i Lite, places a Palm in the hands of internal construction company supervisors, who come to the job site to count workers, tally materials consumed and

note safety issues.

Each day, the inspectors go to a different site; the Palm has to be loaded with that day's project information. At the end of the day, the updates get sent to a central Oracle database, where they are converted into web pages so that company executives can track each job's progress.

UPDATE voice xml

Telephone Transmissions

IMAGINE CHECKING AND SENDING e-mail messages from an ordinary telephone. This is the potential killer app promised by the VXML Forum, an industry group made up of heavyweights AT&T, IBM, Lucent Technologies and Motorola, as we wrote in "Say the Magic Word" (CIO, Oct. 15, 1999).

VXML, or voice extensible markup language, is a new programming platform that enables voice recognition and text-to-speech over the internet; however, at least one voice-over-web vendor doesn't believe VXML will deliver on its promises. Silicon Valley startup MessageBay just unveiled a two-way voice messaging service to help companies add voice to their websites using existing compression technology instead of VXML. CIOs can add MessageBay's voice messaging products to their web pages by writing a few lines of JavaScript and HTML code. MessageBay acts as an ISP hosting the voice data. End users, after downloading a small browser component, can send voice messages via their PCs back to the website.

"We're not strong believers in VXML," says Jon Louis, CEO of MessageBay in Santa Clara, Calif. "It isn't necessary and won't become a standard because you can do the same things [with it that you can] with today's technology." MessageBay's target customers include online greeting card and photo albums sites, internet personals, discussion groups and e-mail providers. At least one executive using MessageBay products is thrilled at the idea of putting his voice out on the web. "I've got my groove back, baby," he says, in Austin Powers-speak.

What about the capability to conduct e-mail transmissions over regular telephones? Don't bet on it, at least for now, says Louis. "We're looking into those kinds of things, but it's going to take a long time for text-to-speech technology to handle the regular speaking voice," he says.

—Tom Kaneshige



"Any database strategy that lacks this kind of functionality is going to lack a key dimension of data accessibility going forward."

—Carl Olofson,
IDC

Replication capabilities, especially two-way synchronization, were a key decision factor, says Chen.

The market for small-footprint databases is still limited, says IDC's Olofson, dominated by ISVs such as Sugar Loaf Software and Bidcom, and early-adopter enterprises. But in the future, he says, they will become more and more important. "Any database strategy that lacks this kind of functionality as part of the picture," says

Olofson, "is going to lack a key dimension of data accessibility going forward, particularly if your aim is to support people who aren't sitting in their office." ■

Amy Helen Johnson writes about the intersection of business and technology from Seattle. She can be reached via e-mail at amyhelen@pobox.com.



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PREDICTIONS

customer relationship management

Eye on the Customer

IF YOU HEAR A KNOCK, knock, knocking at the door, chances are it'll be salespeople hawking customer relationship management (CRM) wares. And they're eyeing a huge market opportunity: Companies are expected to spend a combined \$90 billion in 2003 integrating new CRM systems.

At least these are the numbers being bandied about by market researcher IDC. Worldwide CRM services revenues, including consulting, systems integration and outsourcing will exceed \$40 billion in 1999, and jump to a staggering \$90 billion in 2003, predicts IDC (a sister company to *CIO*). These figures dwarf those previously presented by Aberdeen Group, a Boston-based research company, which forecasted that the CRM market will hit \$4.45 billion by 2001.

The whirl of CRM hype centers around an ambitious goal: building an integrated and corporatewide view of the customer. By tying together all the front-office functions that involve customer contact, companies aim to present a single face to the customer. This means that disparate customer-care and ERP systems must be linked. More important, however, customer-facing IT systems in sales, marketing, call centers and online support must become organizationally and technically integrated.

Why all the fuss? It's good old-fashioned customer service speak, says Katrina Menzigian, manager for IDC's CRM services research program. "It's cheaper to encourage existing customers to buy more products and services than it is to court new customers...and today's consumers have little tolerance for inefficient customer service," she says.

Consequently, corporations are creating new departments and job titles, such as vice president of customer care. Vendors and service providers haven't missed the signs, either. Companies big and small, from all sorts of backgrounds, are staking out the market for the first time, according to IDC. Within the past 18 months, most of the major consulting and systems integration firms have introduced a CRM offering.

—Tom Kaneshige

new products

Screaming Streaming

For CIOs who want to bring video to their websites, **VoraxRD.com** has announced a new service called **AddView**. The Sunnyvale, Calif.-based company claims Addview is the first full-motion, real-time video streaming service for the internet. It enables users who are accessing participating websites to pan, tilt and zoom an Addview remote camera from their PCs.

According to the company, it'll be a boon for tourism advertising. Imagine a camera at any location—such as an island in the Caribbean—and an internet user can move the cameras around, explore the island in real-time, get a live look at the beaches and check out the latest weather before making hotel and plane reservations. The cost of this service is less than \$200 per camera, including ISP charges.

To learn more, call 408 992-0172 or visit www.voraxrd.com.

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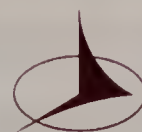
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UNDER DEVELOPMENT

wireless technology

Into the Future—Without Wires

IMAGINE USING your mobile phone to check your e-mail, join a videoconference or make hotel reservations anytime, anywhere. Heard it all before? This time, it might really happen.

Upcoming third-generation (3G) wireless technology promises to seamlessly pass calls—at speeds of up to 2Mbps—across previously incompatible networks. Proponents say the promised breakthrough will pave the way for a new era of wireless broadband content and applications, in-

cluding multimedia, electronic commerce, mobile stock trading and intelligent agent shopping. Some highly optimistic boosters are predicting that 3G may eventually supplant conventional voice phone networks.

Others note that 3G hasn't even left the drawing board yet. "The standards issue is still being ironed out," says Brian Cotton, director of consulting at Frost & Sullivan, a technology research firm located in Mountain View, Calif. At the moment, it looks like 3G will be based on either

Code Division Multiple Access 2000 (CDMA2000), a favorite of U.S. mobile phone carriers and equipment manufacturers, which have invested heavily in the technology, or Wideband Code Division Multiple Access (WCDMA), which is supported by European mobile telecom interests. Opinions differ on which standard offers the best balance between performance and bandwidth efficiency. "We're already seeing a sort of U.S. versus Europe thing coming up," says Cotton.

Presuming that the industry can agree on a single standard, 3G will offer users no-hassle worldwide voice-and-data coverage. "You can take your cell phone, with full high-speed internet access, to another city, state or country on the other side of the world," says Cotton. "It will provide true seamless roaming with none of the compatibility problems that face today's mobile phone users."

But don't throw away your analog cellular or digital PCS phone just yet. Between the ongoing 3G standards battle and the reluctance of many carriers and equipment makers to ditch their current—and very profitable—mobile phone technologies in favor of a new and untried system, it may be years before 3G becomes a household word. "You'll probably see 3G in trial stages in 2004 or 2005," predicts Eddie Hold, senior analyst for wireless services at Current Analysis, a Sterling, Va.-based technology research company. Most important, Hold wonders if mobile phone users will balk at the sky-high price of 3G phones. "All service providers are talking about wireless internet services, but nothing that will sell a customer a \$500 handset at this point. Hold has one piece of advice for starry-eyed 3G enthusiasts: "Remember Iridium."

—John Edwards

Presuming that the industry can agree on a single standard, 3G will offer users no-hassle worldwide voice-and-data coverage.

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Opinion

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Difference Engine

The Social Impact of Technology

Baby Blues

Raising the next generation has become one more element of our lives in which we rely on technology to do more with less. Can this possibly be a good thing?

BY KATHERINE NOYES

TO MARK THE BIRTH OF OUR FIRST CHILD last year, my husband and I—like many new parents throughout the ages—were the recipients of gifts from friends and relatives far and wide. Some of these were traditional, with a long history in the annals of the baby shower. We received a multitude of baby clothes and a handmade baby quilt, for example—necessities to help us keep the new child protected and warm. We received books and toys, sure to help educate and entertain her. We even received a special monogrammed plate to mark the date and time of her arrival, a memento that has been a tradition in our family for years and that would help her take her place among us. But we also received two



gifts that made us take pause. These gifts were the product of a different era, the fruits of an industry younger than our parents. These gifts could only be described as information technology.

The items I'm referring to are a software package designed specifically for babies—yes, you heard me right—and a PC video camera. Not, by any means, what we were expecting. But that's what made them so interesting. *(Continued on Page 158)*

ILLUSTRATION BY CAMPBELL LAIRD

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Listening to the Ants

BY JIM DONEHEY

CAPITAL ONE STARTED OUT AS a small spin-off from a local bank. When I joined the company, in November 1994, the IT group had 150 people.

As we grew, management became an increasing issue—traditional techniques were becoming untenable. When companies are small, a command-and-control management style is efficient. But the IT organization was growing at a phenomenal rate.

By the end of 1996, I kept struggling with how to assimilate people from different backgrounds and combine culture with the fundamental objectives of IT. I knew that the old days of giving orders were over. Even in Richmond, Va., the IT group was located in five different buildings; the organization as a whole was in five U.S. cities.

I attended a conference sponsored by Ernst and Young's Center for Business Innovation. At the conference, Chris Meyer put this question to me: How do you teach an anthill to fetch? If you put a piece of food down, all the ants form two organized rows to get it and carry it back; but how do they know to do that? Later Eric Bonabeau, from the Santa Fe Institute, and I discussed how social insects operate under fundamental rules that every member of the colony can understand. The ants are only following two rules: If you find food, take it back with you and leave a pheromone trail. If you see another ant

with food, follow the pheromone trail back to the food; then follow rule number one.

As I thought about this concept and the idea that Capital One was still growing, I pondered the question of how to integrate that into the IT organization to make sure everyone was working in the company's best interests. During the Apollo project, NASA had a doctrine they presented to all employees. If you asked a janitor what his job was, he would say, "I'm helping to put a man on the moon."

I wondered how we could do something similar. So I came up with four rules that, if each associate followed, would ensure that they were moving the company forward.

- **Always align IT activities with the business.** Keep the company's big picture goals in mind.
- **Use good economic judgment.** Spend the money like it's your own.
- **Be flexible.** Don't build yourself into one thought pattern.
- **Have empathy.** If someone asks you to do something you don't agree with, put yourself in his or her shoes.

Then I wondered: How do I communicate that to a wider audience? We came up with the Blue Chip Program. We identified gaming chips of different colors to represent the four rules. I distributed 10,000 chips to our internal customers, starting with senior managers. Every time they caught an IT associate doing something that aligned with any of the four rules, I asked them to present the chip to the associate and thank them. If a customer saw any associate doing something that aligned with all four rules, they nominated that associate for a blue chip. I'd then present the blue chip to him or her myself.

It was amazing how quickly everybody in IT knew the four rules. The program ran for a little over a year. But the rules became so ingrained that they became the mantra for the IT organization.

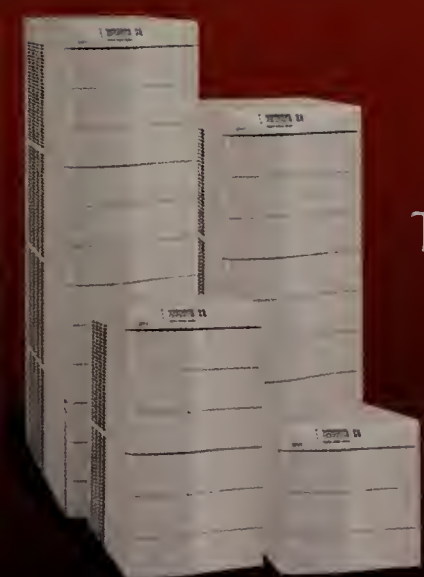
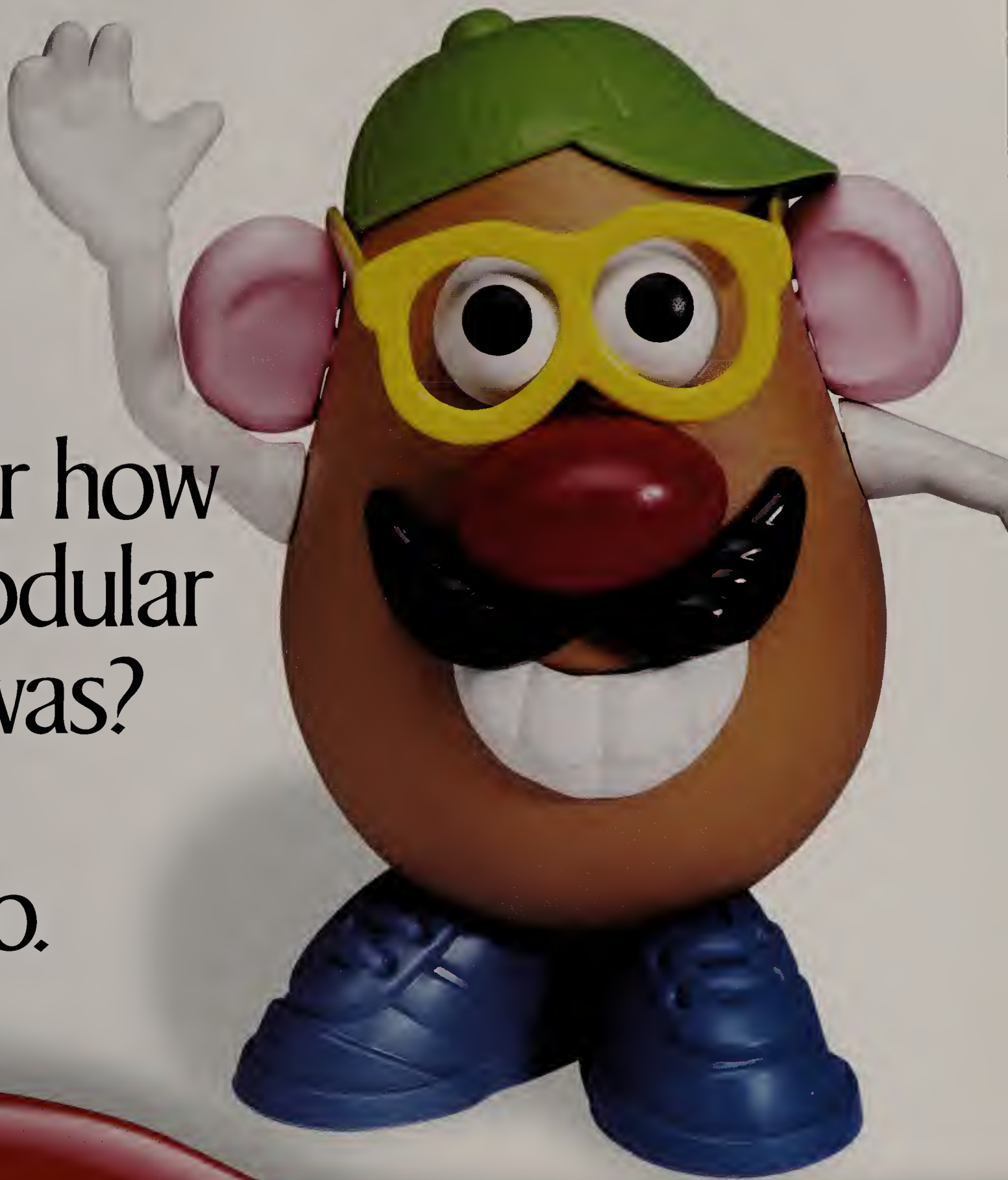
Fundamentally, people want to be empowered. The old management style is obsolete; the larger the organization, the more command and control tends to stifle creativity and innovation. Now, five years on, there are 1,800 full-time associates, 300 to 400 contractors, and we're in seven U.S. cities and three cities abroad. So, how do I know it's working? The attrition rate in the IT industry is around 20 percent. Ours is less than 4 percent. **CIO**

Jim Donehey is senior vice president and CIO of Capital One Financial Corp.



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Bad Voyage

Sure, airline alliances may benefit the members, but they might be ignoring one important participant—the customer

BY MEGAN SANTOSUS

GOING ON VACATION PROVIDES RENEWAL for me in more ways than one. Besides recharging my batteries, traveling affords me an opportunity to spend quality time in an airport, where I invariably encounter more fodder for this column. This summer, just as I thought I was scraping the bottom of the idea barrel, I had an ugly experience with an airline. What I learned was this: Corporate alliances work well only when employees know how to deal with customers.

I traveled to the South Pacific on a hodgepodge of airlines linked together in an alliance network. While my ticket from Boston to L.A. was issued under the name of an international airline (let's call it Airline A), my itinerary pointed out that the flight was actually operated by a different but affiliated U.S.-based carrier (Airline B). (Airline A offers service in Boston only through its alliance with partners.) The time, date and destination on my ticket jibed with a flight leaving Boston by Airline B, but the flight number was different.

That difference proved a crucial stumbling block to employees at the check-in counter of Airline B. They had no idea why I was in their line with a ticket issued by Airline A expect-



ing to get on one of their flights. Since my final destination was Sydney, I was directed to Airline B's check-in desk at the international terminal. (Never mind that I had called ahead and was told to show up at the domestic terminal.) At the international terminal, I was greeted by equally perplexed check-in attendants who had no idea why I was in their line with a ticket issued by another airline expecting to get on one of their flights. Finally, an employee at the tourist info booth—not affiliated with either airline—called flight operations and straightened things out. (And yes, I was in the right place from the beginning.) This pattern of misdirection was repeated in L.A., where my luggage got checked on the right flight to Sydney. The problem was, I didn't. As it turns out, I was directed by an Airline B employee to Airline B's terminal even though I should have been at Airline A's terminal to catch the international flight.

ILLUSTRATION BY JACQUES LAPLANTE

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No doubt, the nine regional airlines that form the alliance view their association as a strategic arrangement. The idea, of course, is to entice passengers to travel on an alliance partner airline with the promise of convenient schedules (an alliance flight departs somewhere in the world every 10 seconds) and frequent flyer miles redeemable across airlines. A website touts the “seamless experience” provided to passengers and describes the enabling role technology plays.

Things such as integrated computer reservation systems, a comprehensive customer database and an internet-based reservation tool certainly make alliances among different airlines run smoothly behind the scenes. But the wonders of technology shrink in the eyes of customers if frontline

employees don't have a clue.

Customers don't care whether a company's legacy ERP systems are perfectly integrated with the e-commerce front-end running on a partner's website. True, technology makes a lot of partnerships possible and can lead to better, more convenient services. But companies bent on providing customers with a “seamless experience” would do well to devote more attention to training people. Otherwise, all that technical wizardry is wasted. **CIO**

Do you think Reality Bytes? Tell disgruntled traveler and Senior Editor Megan Santosus why at realitybytes@cio.com.



Opinion | Difference Engine

(Continued from Page 152) The baby software—referred to affectionately by those who promote it as “lapware”—purports to offer parents a way to provide their children with stimulation, interaction and early exposure to the PC. The thinking, apparently, is that infants and parents will use the software together, while the child sits on the parent's lap. Activities include naming, sorting and sing-alongs, all of which are presented by a “cuddly” onscreen teddy bear.

It's not hard to guess why parents are shelling out some significant toy money on these products (between January and October of last year, they spent almost \$1 million on baby software, according to PC Data, a Reston, Va.-based research company that tracks the industry; sales of software for toddlers, meanwhile, exceeded \$10 million).

In our overcrowded, highly competitive world, kids can use all the help they can get in the struggle to succeed—or so these parents must figure. Indeed, “Boomer parents are taking every step they can to make sure their kids are prepared for Harvard right out of the womb,” Robin Raskin, editor in chief of *Family PC* magazine, recently told *The New York Times*.

At the same time, it's not at all clear that these products fulfill that promise. A recent report by the American Academy of Pediatrics argues that children should not be exposed to TV, movies or computers at all before the age of two. Direct interaction with caregivers, the report said, is what young children need for proper development.

But what does this trend say about our society? Besides reflecting our competitiveness and our fear of failure—whether our own or that of our children—one could argue that it is a symptom of our chronic lack of time. Given the ever-decreasing leisure time we are able to spend with our children, we feel

pressured to make the most of what we do have; rather than “waste” that time on simple games and activities, we hope to maximize the value of that time to our children by way of information technology.

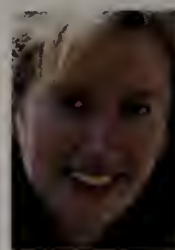
The assumption there, of course, is that information technology can somehow provide value that we ourselves can't. Anything computerized, we seem to feel, must be more valuable than anything that isn't. The technology that was originally a means to an end has now become an end in itself.

Perhaps more troubling, though, is the fact that we have so little time to spend with our children in the first place. Our lives are so frenzied that raising the next generation has become one more element of our lives in which we rely on technology to do “more with less.”

As for the PC video camera we received, the friend who gave it to us offered this by way of explanation: “Now your families will be able to watch your daughter grow up in person!”

Now, it is true that our families are widely dispersed, so visiting is not a matter of driving just over hill and down dale. In many ways, the gift was an inspired idea, for it would in fact provide one more means of contact when distances made personal visits impossible. But somehow, the gift struck a very sad chord in my heart. By substituting a technological connection for a personal one, we're devaluing the very bonds we're trying to maintain. With so many IT-based means of keeping in touch—telephone, e-mail and now video connections—personal visits start to seem a little less imperative. Once again, the technology that was once a means is slowly becoming an end. **CIO**

Has technology affected your family life? Tell us how at difference@cio.com.



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* PC Computing, July 1999

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Opinion | From the Publisher

gbeach@cio.com

Digital Polls

LATE LAST YEAR, research from CIO, *The Wall Street Journal* and NBC News all arrived at the same conclusion: more than half of Americans now favor using the internet as a channel in the voting process.

As the primary season gets into full swing, why are political leaders dragging their collective heels when it comes to using the internet in an effort to reach the 56 percent of registered voters who stay away from the polls? Largely because no leader has directly championed the cause.

Republican leaders tend to cast internet voting as a “digital motor voter” initiative designed to register more Democrats. Most of the leaders in the Democratic party shy away from advocating internet voting because they see technology use as the domain of rich, white Republicans. Some in Congress—an institution where every vote since 1973 has been conducted electronically—will admit off the record that they are comfortable appealing to the 44 percent of Americans who do vote regularly. Moreover, the nearly 25 million people between the ages of 19 and 24 who are eligible to vote in the 2000 general election scare politicians to death. (Good luck figuring *that* group out!)



Gary J. Beach

Our nation remains rudderless on the issue while vocal critics raise the fear flags of security, anonymity and equal access. Could foreign governments corrupt U.S. elections? Will individual voting habits be subject to prying eyes? Does the digital divide make internet voting unfair in America?

I am convinced that a strong political leader who challenges the nation and the technology industry to address those issues by a specific date—much like President Kennedy inspired America to go to the moon and back within a decade—will counterbalance that fear, thus setting the nation on its way to using the internet as the most powerful tool of democracy ever invented. And such a politician will probably get elected next November.

Who will that leader be? Where is he or she hiding?

Internet voting will first flourish in the local elections held in thousands of communities and townships across America. State elections will follow and sometime in the near future all of us will be afforded the opportunity—and the right—to vote for the president of the United States on the internet.

Americans are not staying away from the electoral process because we are an apathetic lot. The most offered explanation given by Americans as to why they do not vote is time—we do not have enough of it. The spirit is willing but soccer practice, evening jobs and fatigue from the hectic pace of life gets in the way.

Let's make our politicians work harder to get elected. Let's challenge them to figure out what the *majority* of Americans care about. Let's use the internet as the tool to send them that message.

What's your view? Send me mail at gbeach@cio.com. I look forward to hearing from you.

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IMAGINATION AND INNOVATION AT ITS BEST.

If you want to see how *smart* IT and innovative solutions can change a company's business, just look to the five forward-thinking organizations honored by this year's *CIO* magazine Enterprise Value Awards.

They're all in different industries; they all faced unique challenges; and all had different missions and objectives. Yet they all found ways to improve, and virtually *redefine* the character of their businesses by applying information technology creatively and intelligently.

For four consecutive years now, AT&T Solutions has been proud to underwrite the *CIO* magazine Enterprise Value Awards, to encourage and recognize excellence, and to applaud bold, 'ahead-of-the-curve' thinking. These are the values we strive for as a company, and admire in our partners and even in our *competitors*.

AT&T Solutions is helping clients manage today, transform and innovate for tomorrow to create value in this new frontier.



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Interview

BY POLLY SCHNEIDER

yobie BENJAMIN

Yobie Benjamin has followed internet and e-commerce trends for longer than those terms have existed. As chief of global strategy for e-commerce and emerging technology at Ernst & Young in San Francisco, Benjamin works with dotcoms and Fortune 500 companies looking to excel on the net. He shares with *CIO* some of the myths and best practices of global e-commerce.

CIO: What are the biggest mistakes companies make when launching a global e-commerce operation?

BENJAMIN: Many people assign a VP for e-commerce, but that's not enough. I've seen it a dozen times: you have this VP, this bright star, he's so happy... the next thing you know he's scouring for resources. Success requires sincere investment from the highest level—the chairman, CEO and major shareholders.

People ask, "Should I start an e-commerce division?" I say no. It creates a super class in the company because it's this cool, sexy thing—and the rest of you can go about doing your same old business, by the way. You can't commit to e-commerce in pockets.

Then you have the dotcom startups that

forget the discipline of how to become a real company. They want the IPO and once they get there, they lose interest.

How should companies approach the global marketplace?

With internet technology you're global from day one. Whether you're General Motors or a small antiques store in Kentucky, the day you go on the internet, everyone can see you. Your customers are no longer the people in your own community. The internet is the most unforgiving medium on the planet. The customer rules, and if you make a mistake they probably won't come back.

What about setting up foreign divisions?

Pursue partnerships rather than setting up a \$10 million division in a new country. For instance, a lot of internet companies want to get into China. Instead of going in and building a whole new Yahoo.com, why not partner with China.com? Partner with the strongest player.

What kind of net businesses will thrive?

If you have a lot of eyeballs, you'll succeed. Community is crucial. Gaming.com is able to aggregate all the people who play games in the world. It's a defined audience and very loyal—almost cultlike. What won't survive are people who say, "I'll build a great portal for kitchen supplies or food." Why would I go to a food portal? People can only eat so many things. There's no fanaticism about food compared with games.

I might have to disagree with you there.

The most fanatical areas—research bears this out—are health, parenting, games and finance. There's no stickiness to a wine.com.

You sure about that?

Buying wine is transactional, and the community of wine lovers is not large. **CIO**

Senior Writer and wine lover Polly Schneider welcomes your comments at pschneider@cio.com.



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Doug saved on Daisy's vet bills by visiting his company's Intranet site.



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The Face of the Now Economy

APRIL 16-19, 2000 ■ RITZ-CARLTON ■ NAPLES, FLORIDA

SUNDAY, APRIL 16

11:30 a.m.

The Leaderboard Classic Golf Tournament

Hosted by Cabletron Systems, Inc. and
Lockheed Martin Corporation

3:30 p.m. – 5:30 p.m.

Conference Registration

6:30 p.m. – 8 p.m.

Welcome Reception and Registration

8 p.m. – midnight

Hospitalities/Networking

MONDAY, APRIL 17

7:30 a.m. – 8:30 a.m.

Breakfast

8:30 a.m. – 9 a.m.

Welcome, Opening Remarks and
KnowPulseSM Poll

Gary Beach

Publisher

CIO magazine

9 a.m. – 9:45 a.m.

Organizations Must Be Nimble,
Organizations Must Be Quick

Dr. Jim Wetherbe

Conference Moderator

FedEx Professor of Excellence

The University of Memphis

Executive Director

FedEx Center for Cycle Time Research

9:45 a.m. – 10:45 a.m.

Entertainment — Reinventing the Industry

Justin Yaros

Senior Vice President and CIO

Twentieth Century Fox

10:45 a.m. – 11:15 a.m.

Coffee Break

11:15 a.m. – 12:05 p.m.

Business Briefings

12:10 p.m. – 1:10 p.m.

Luncheon

1:15 p.m. – 2:15 p.m.

Navigating in the Digital Marketplace

Ann Delligatta

COO

autobytel.com inc.

2:20 p.m. – 3:10 p.m.

Business Briefings

3:10 p.m. – 3:40 p.m.

Coffee Break

3:45 p.m. – 4:45 p.m.

Connecting to the Three Insatiable
Customer Demands

Rob Rodin

Former CEO and President

Marshall Industries, Inc.

Author, Free, Perfect, and Now: Connecting
to the Three Insatiable Customer Demands:

A CEO's True Story

5:30 p.m. – 7 p.m.

Reception

7 p.m. – midnight

Hospitalities/Networking

TUESDAY, APRIL 18

7:30 a.m. – 8:30 a.m.

Breakfast

8:30 a.m. – 9:30 a.m.

Making Life Better for Our Members
and Guests

Michael Dillard

Executive Vice President and CIO

ClubCorp, Inc.

9:30 a.m. – 10:30 a.m.

The American Red Cross and the "Now
Economy": Moving One of America's Most
Trusted Logos into the Digital Economy

Thomas H. Woteki, Ph.D.

CIO and Senior Vice President

American Red Cross

10:30 a.m. – 11 a.m.

Coffee Break

11 a.m. – 11:50 a.m.

Business Briefings

Noon – 1 p.m.

Luncheon

1 p.m. – 2 p.m.

A Networking Experience

2 p.m. – 2:50 p.m.

Business Briefings

3 p.m. – 3:50 p.m.

Business Briefings

3:50 p.m. – 4:15 p.m.

Coffee Break

4:15 p.m. – 6:15 p.m.

Business Life Through the Prism of Machiavelli

Stanley Bing

Author, What Would Machiavelli Do?

and Lloyd: What Happened

6:15 p.m. – 7 p.m.

Reception with Stanley Bing

7 p.m. – midnight

Hospitalities/Networking

WEDNESDAY, APRIL 19

7:30 a.m. – 8:15 a.m.

Breakfast

8:15 a.m. – 8:30 a.m.

KnowPulseSM Poll Results

Lew McCreary

Editorial Director

CIO magazine

8:30 a.m. – 10:30 a.m.

Leadership and Change: Challenges
in the New Economy

John P. Kotter

Professor, Harvard Business School

Author, John P. Kotter on What Leaders

Really Do

10:30 a.m. – 11 a.m.

Coffee Break

11 a.m. – 11:30 a.m.

Question & Answer Session with John P. Kotter

11:30 a.m. – 11:45 a.m.

Closing Remarks

Jim Wetherbe

KEYNOTE PRESENTER



John P. Kotter
Professor
Harvard Business School

Author, *John P. Kotter on What Leaders Really Do*

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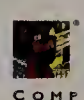
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